AFRICAN ELEPHANTS

CITES

AND THE IVORY TRADE

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FOREWORD

This publication consists of two reports prepared by consultants for the CITES Secretariat. The first, "Establishment of African Ivory Export Quotas and Associated Control Procedures", by Rowan B. Martin, relates to elephant populations, the ivory export quota system and relevant administrative procedures. The second, "The World Trade in Raw Ivory, 1983 and 1984" by John R. Caldwell and Jonathan Barzdo (of the Wildlife Trade Monitoring Unit of IUCN's Conservation Monitoring Centre), relates to the international ivory trade. These reports were distributed to a limited audience in draft form in April 1985. Following the fifth meeting of the Conference of the Parties to CITES (Buenos Aires, 1985) the texts have been revised and amended, and also translated into French and Spanish.

Although the opinions expressed in these reports are those of the authors and do not necessarily reflect the views of the CITES Secretariat, it has been acknowledged that the contents provide the necessary basis for the establishment of the procedures required for the full implementation of Resolution Conf. 5.12 on "Trade in Ivory From African Elephants". The CITES Secretariat believes that these reports form a major contribution to the development of conservation programmes for the African elephant.

The Secretariat wishes to thank the authors for their excellent work and the Commission of the European Communities for its financial support for the whole project, as well as for generous provision of translation services. In addition, the Government of Zimbabwe provided facilities and allowed R.B. Martin to undertake the work.

ESTABLISHMENT OF AFRICAN IVORY EXPORT QUOTAS

AND ASSOCIATED CONTROL PROCEDURES

Report to the CITES Secretariat

by

R.B. Martin

1 March, 1985
(Revised 1 August, 1985)

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APPENDICES

TERMS OF CONTRACT AND WORK CARRIED OUT

The objectives of the project were as follows:

(i) To collect and collate the best available data and information relating to the status of the African elephant Loxodonta africana.

(ii) To assist governments in establishing quotas for the export of raw ivory.

(iii) To recommend procedures for the control and co-ordination of the export quota system.

The project lasted from 15 November 1984 to 1 March 1985, during which period I visited Botswana, Zambia, Malawi, Tanzania, Kenya, Somalia, Ethiopia, Sudan, Chad, Central African Republic, Cameroon, Gabon, Zaire and Congo (in that order). I had also hoped to visit Angola, Mozambique and Ivory Coast (being other major producers), but time did not permit this. Indeed, it was not possible to spend more than 3-5 days in those countries which I did visit.

I met with the Chairman of the IUCN/SSC African Elephant and Rhino Specialist Group (Dr. David Western) in Nairobi to discuss the project, and obtained recent data on elephant populations from Iain Douglas-Hamilton. I familiarised myself with the population modelling work being carried out by Pilgram and Western, which has important applications for management of elephants.

This report is the final requirement of the contract.

NOTE: The final draft for publication was prepared after the 5th meeting of the Conference of the Parties to CITES in Buenos Aires (22 April-3 May 1985). As a result of resolutions passed and documents accepted at this meeting I have revised the final chapter on Administration to include a description of the control procedures agreed between the Party states, the reasons for these controls and the effects they may be expected to have on the trade in ivory.

ABSTRACT

Estimates of elephant population numbers for ivory producing countries were assembled from several sources. The results of recent surveys were used where these were available, and official estimates from the wildlife authorities in certain countries were preferred if these were based on recent information. In some countries for which there were no data an estimate was arrived at based on rainfall and human densities, combined with local knowledge of the various parts of the country. Where no new information was available, the population estimates from the IUCN/SSC meeting held in Hwange, 1981, were used.

All countries visited favoured the introduction of a quota system. It should exclude countries who have no elephant, lead to improved internal management in the ivory producing countries, and strengthen the authority of government wildlife agencies within their own countries.

A method is given for estimating the expected ivory production from a country based on the areas where elephant occur, the populations in those areas, and the various causes of elephant mortality. From the total production of tusks an export quota can be estimated after adding surpluses from previous years and deducting the amounts which will be consumed by domestic carving industries.

It is emphasized that the setting of quotas should be regarded as a form of active, adaptive management. Whilst the estimates of quotas may be inaccurate in the first few years, they can be improved each year provided the necessary data acquisition systems are introduced at the outset.

Various principles of harvesting elephant populations are discussed using computer models to predict outcomes. The maximum sustained yield of ivory would be that derived from the natural mortality in a stable population which has reached carrying capacity (Pilgram and Western, 1984). The practicality of allowing elephant ever to reach this stable state is questioned, and the effect of harvesting from fast growing populations below carrying capacity is examined. At a population level of one million animals, models indicate that a sustained harvest of about 750 tonnes can be obtained by culling breeding herds and managing for large males.

Models were examined which demanded a constant harvest of ivory from populations, combined with selective hunting for the largest tusks. The maximum sustainable harvest from a million animals was about 400 tonnes per annum. Exceeding this resulted in rapid population declines. Modelling was used to simulate the current situation in the ivory trade given a value for mean tusk weight, the number of animals harvested per year, the annual harvest in tonnes, and a declining elephant population. The population status which satisfied all conditions was that of about 800 thousand animals declining at a rate of 1.8%. If the present harvest level were sustained the rate of decline of the population could be expected to increase rapidly in the near future.

It is pointed out, however, that such modelling is of limited value: Africa's elephant population is not one large herd being subjected to a uniform harvesting treatment. There are many secure populations in National Parks, and this means that the harvest is coming from only a part of the continental population. The process in operation is a series of local extinctions, rather than a general decline of all elephant.

Quotas were estimated for individual countries based on the approach that the offtake should not exceed 1-3% of populations depending on management policies and circumstances in the country concerned. This resulted in a crude estimate of a sustained yield of some 230 tonnes for Africa as a whole, of which 80 tonnes would be consumed internally and 150 tonnes exported. An existing surplus of 185 tonnes at present in government stores could be added to this for the first year of the quota. The result is consistent with a 2% offtake calculated globally from a population of one million animals. It is also consistent with a model which tested the effects of various harvests on reducing the present trend. The present level of offtake from elephant populations combined with selection for the largest tusks cannot be considered optimal management.

Administrative procedures necessary to make the quota system workable at an international level are discussed. This includes procedures for export, the marking of tusks, rules for worked ivory, the definition of re-export, referral of export permits, and provisions for small pieces of ivory. It is recommended that the export of confiscated ivory is kept separate from the rest of the quota, because it is difficult to estimate in the first place, and because it cannot justifiably be called the result of planned management programmes.

Comments are made on the large variations in the price of ivory from one country to another in Africa, and the possibility of joint marketing among countries is advanced as an option to improve the situation.

Internal administration is viewed as the major problem facing most countries. Emphasis should be placed on efficient anti-poaching measures, improved controls on raw ivory in private hands, enforcement of correct hunting procedures, and methods of selling ivory. The domestic carving industries in many countries are major users of illegal ivory and strategies need to be found for governments to control this flow.

Few countries have programmes for the rational utilisation of wildlife and the majority of government ivory comes from confiscations rather than planned offtakes. This is seen as a failure of conservation policies to take into account the realities of the situation outside protected areas. It is suggested that in certain instances governments should recognise the inevitability of illegal hunting, and seek ways to manage it rather than to ban it or to ignore it.

Finally, the administrative systems in individual countries are discussed. This includes wildlife policies, staff establishments, and procedures for handling the ivory trade. Practices which are unique to certain countries are mentioned.

Footnote: At the 5th meeting of the Conference of the Parties to CITES in Buenos Aires in April/May 1985 a Resolution was adopted which will bring the quota system into operation in January 1986. Several important administrative procedures will come into effect at the same time:

1. An Ivory Unit will be established under the CITES Secretariat which will maintain a data bank of all tusk numbers in the trade, monitor export quotas and assist with referral procedures.

2. Both producer and non-producer countries will register all present stocks of ivory which may enter the international trade and submit the details to the Ivory Unit. This will allow separation of primary export statistics from re-exports in analysing the volume of the world ivory trade.

3. A set of referral procedures will come into place whereby no importing country will clear an ivory shipment until the Management Authority in the exporting country has confirmed the validity of the export permit with the Management Authority of the importing country, either directly or via the CITES Secretariat. Copies of all export permits will also be sent to the Ivory Unit to enable them to monitor quotas and assist with referral procedures.

ACKNOWLEDGEMENTS

I will begin by thanking the wildlife authorities in each of the countries I visited. In all of these countries I found dedicated, enthusiastic officers, and this bodes well for the future. There is a tendency for the outside world to regard the wildlife authorities in the ivory producing countries as part and parcel of the problems in the international ivory trade: I believe this is largely untrue. Most of the authorities are highly concerned about the decline in elephant numbers in their countries, and are anxious to halt illegal hunting. However, they have inadequate budgets, staff and equipment, and are frequently under extreme pressure from politicians and private citizens - pressures which western democratic countries would find difficult to appreciate.

As a civil servant of Zimbabwe, I know my own feelings towards the endless stream of consultants who use my valuable time and pick my brains for information for their reports, the worth of which I question. I have now found myself in the role of a consultant, and I am surprised that the following people gave so freely of their time to make my mission possible.

BOTSWANA: Mushanana L. Nchunga (Director), G.T. Masina (Chief Warden)

ZAMBIA: Star M. Yamba (Director), Dr. H.N. Chebwela (Deputy-Director), A.N. Mwenya (Chief Warden), George Mubanga (Sen.Wl.Res.Off.).

MALAWI: Moses Kumpumula (Chief Parks and Wildlife Officer), Henri Nsanjama (Principal Parks and Wildlife Officer), Dr. R.H.V. Bell (Sen.Parks and Wildlife Officer [Research]).

TANZANIA: Fred Lwezaula (Director), J.A. Kayera (Deputy-Director), Muchungusi Katalihwa (G.O.), Mr. Merinyo (Chief Admin. Officer), Karim Hirji (Director-General of Serengeti Wildlife Institute), Mr. Ndalango (Director TAWICO), Mr. Kente (Regional Game Officer), Bokari Mbano (Principal, Mweka College).

KENYA: J.P. Oriero (Director Conservation).

SOMALIA: Dr. Abdillahi Ahmed Karani (Gen. Manager National Range Agency), Yousuf Mohammed Ahmed Harare (Director Wildlife).

ETHIOPIA: Abdu Mahamued (OIC Wildlife Utilisation and Anti-Poaching).

SUDAN: Dr. El Rayah Omer Hasaballa (Director Wildlife Conservation and National Parks Forces).

CHAD: Ali Djalbord Diard (ministre du Tourisme, des eaux et forêts), Daboulaya Ban-Ymari (directeur des Eaux, forêts et chasses), Naipadja (chef Div. faune), Djimet Moudzima, Todjimbaye Nahodjim, Daniel Djelardje.

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GABON: Raphaël Dipouma (directeur des Eaux, forêts et chasses), Henri-Max Boudiala (chef du Service des chasses).

ZAIRE: Mankoto ma Mbaelele (directeur IZCN, conseiller au Cabinet de commissaire d'Etat), Muembo Kabemba (directeur scientifique et techniques du Service de la chasse), Dr. Bihini won wa Musiti (chef du Service de la chasse).

CONGO: Francois Ntsiba (sec. général aux Eaux et forêts), Rigobert Ebonzo, Opouya Joseph, M'beri-Mbabou Emmanuel.

If I may single out particular countries without giving offence to others, I would like to thank particularly the officials of Chad and Zaire with whom I felt a special rapport during the course of our work. George Mubanga (Zambia), Bokari Mbano (Tanzania), and Abdu Mahamued (Ethiopia) gave me a large amount of their time and helped to make my stay in their countries very pleasant.

The following non-governmental staff assisted me during the course of my travels in various countries: In Kenya, from the African Elephant and Rhino Specialist Group, Dr. David Western gave me sound counsel on the project, Tom Pilgram spent considerable time with me discussing management strategies, and Iain Douglas-Hamilton provided data on status and trends of elephant populations. Mike Norton-Griffiths gave me an excellent insight into the processes at work in the rural areas of Kenya and Tony Archer assisted me with more than travel arrangements. Dr. Murray Watson gave me data and background information in Somalia, and Martin Butterworth and Trevor Wilson of ILCA made my stay in Addis Ababa very pleasant. Gaafar Elias Basaid in Sudan explained to me many intricacies of the ivory trade and Richard Carroll of Yale University very kindly interpreted throughout my meetings in the Central African Republic. David Lloyd and G. von Wild of Uele Safaris in Zaire were extremely good to me, both in providing information and hospitality. Brigitte Manet interpreted for me in Gabon and Ernest Fausther of UNDP Congo gave a large amount of his time in interpreting and attending to my other problems.

I thank the UNDP/UNEP offices which assisted me with the logistical problems of travelling to so many countries in such a short time. In particular I would like to thank Robin Kinloch, the Resident Representative for Zaire, who took a close interest in my work, was extremely hospitable and solved several minor crises for me. In the Congo, the acting Resident Representative, Michael Askwith, gave me a similar reception and his staff were very helpful.

Jaques Berney and Chris Huxley of the CITES Secretariat have done a great deal to make this project a success, and I thank them for their efficient handling of all matters.

I am grateful to the Director of the Department of National Parks and Wild Life Management in Zimbabwe, Dr. Graham Child, for allowing me to undertake this consultancy and for valuable advice relating to it. I thank also my fellow staff members John White and Graham Nott for the large amount of time they have spent familiarising me with the internal administration of the ivory

trade in Zimbabwe. It became very clear to me during the course of my travels that nowhere else in Africa is there such an efficient system of controls. Jonas Chifota in our computer section assisted me by checking calculations, and our librarian, Maggie Taylor, provided an extremely rapid service on all required literature.

Finally, my very special thanks to the following people.

Jean-Marc Froment of FAO travelled from Senegal to Bangui to meet me and give me his findings in a significant study of the ivory trade in C.A.R. This work was invaluable to me and quite beyond the scope of anything I could have achieved in my short visit. As a result, I was able to use my time in C.A.R. to address the important conservation issues armed with sound information. Apart from the report, the close contact with him for four days in Bangui gave me an understanding of the systems operating in Francophone countries which was of value for the remainder of my trip.

Richard Bell of Malawi has assisted me with analysis of data, in-depth discussion of management issues, correspondence on practical administrative matters, and an extremely detailed and valuable criticism of the final draft of this report. The concept of "legalised poaching" advocated in this report was first recommended to me by him. I thank both Richard and his wife Kathy for their hospitality and stimulating company.

Ian and Chris Parker were extremely kind to me during a long stay in Kenya, and must have been extremely pleased when I finally left for Somalia. I value very highly Ian's pragmatic advice on all issues relating to the ivory trade, and regard him as a major philosopher. At times he leaves me totally frustrated when he picks the holes in my "wishful" proposals to improve the conservation scene in Africa, but I have learnt that his advice is not be be ignored. I thank both Parkers for their wisdom and hospitality.

I thank David Cumming, my boss and colleague, for his part in this report. My acceptance of this consultancy affected his own long-standing plans for personal leave, but he allowed it nevertheless. The rapid workshop techniques which I used to advantage in several parts of this mission have evolved through his leadership in our Branch of Terrestrial Ecology. The practical aspects of managing elephants populations have been tried and tested in Zimbabwe under his direction and planning. He has criticised and suggested improvements to this report, and been available for discussion throughout the project. I am very grateful.

Lastly, my very special thanks to my wife Elizabeth who has effectively been a widow during the course of this consultancy, but has still kept everything working in my absence. She has helped criticise the final draft of the report, provided sage advice and encouragement, and generally made the whole mission possible.

1. ELEPHANT POPULATION ESTIMATES

SOURCES

The elephant population estimates for Africa (Table 1) have been compiled from Cumming & Jackson (1981), Douglas-Hamilton (1984), official estimates from the wildlife authorities in the countries visited, and certain new estimates which I have made in collaboration with the technical staff of the countries concerned. At the recent meeting of the Technical Committee of CITES in Brussels (1984), it was agreed that the estimates derived at the IUCN/SSC meeting at Hwange in 1981 would serve as the official data until better estimates were available. In preparing the figures I have accepted the IUCN/SSC estimate in each case unless there have been sound reasons for revising it. In some countries the authorities felt fairly strongly that their official estimates should have preference over any others, and in these cases I have accepted their views.

In Table 1 all the above estimates are shown for comparative purposes. Douglas-Hamilton has prepared both a low and a high estimate for each country and both are included. Where confidence intervals exist for certain countries, these are given in the text. I have rounded off all estimates to the nearest hundred animals: there are few cases where a higher precision is justified. Each country is now discussed individually and the reasons for selecting a particular estimate are given.

The summary table from the IUCN/SSC Hwange meeting is referred to as WM, and Douglas-Hamilton (op. cit.) is referred to as IDH in the following text. Unfortunately, there are no formal references given in the latter work, and in the master table I have had to judge from the proportions of each estimate arising under "aerial surveys", "ground and dung counts", and "informed guesses" whether new information has come to hand since the Hwange meeting.

TABLE 1: ELEPHANT POPULATION ESTIMATES

	DOUGLAS-HAMILTON LOW	DOUGLAS-HAMILTON HIGH	IUCN/WWF 1981	NATIONAL ESTIMATE	NEW	FINAL
WEST AFRICA						
Benin	2 085	2 503	1 250			2 300
Ghana	2 599	2 599	970			1 000
Guinea	615	615	800			800
Ivory Coast	4 840	5 456	4 800		4 840	4 800
Liberia	763	763	2 000			800
Mali	616	617	780			700
Mauritania	0	0	40			0
Niger	745	745	800			800
Nigeria	1 373	1 579	1 820			1 500
Senegal	67	80	370			100
Sierra Leone	260	260	500			500
Togo	100	100	150			100
Burkina Faso	3 865	4 503	3 500			3 500
					TOTAL	16 900
CENTRAL AFRICA						
C.A.R.	6 815	10 850	31 000		19 500	19 500
Cameroon	12 056	12 773	5 000			12 400
Chad	16 453	31 900		2 500		2 500
Congo	2 765	4 506	10 800	12 500	59 000	59 000
Equat. Guinea	1 800	1 800				1 800
Gabon	12 014	24 028	13 400	14 000	48 000	48 000
Zaire	116 472	248 564	376 000	100 000	523 000	523 000
					TOTAL	666 200
EAST AFRICA						
Ethiopia	6 041	7 249		9 000		9 000
Kenya	52 330	61 196	65 056	27 956		28 000
Rwanda	72	77	150			100
Somalia	5 576	10 944	24 323	15 000	8 600	8 600
Sudan	26 616	37 939	133 772			32 300
Tanzania	196 418	235 438	203 900			216 000
Uganda	1 790	2 107	2 320			2 000
					TOTAL	296 000
SOUTHERN AFRICA						
Angola	1 922	3 980	12 400			12 400
Botswana	41 226	49 471	20 000			45 300
Malawi	2 358	2 358	4 500	2 350		2 400
Mozambique	48 620	48 620	54 800	27 350		27 400
Namibia	33 533	40 239	2 300		2 000	2 000
South Africa	7 961	9 483	8 000	8 273		8 300
Zambia	91 142	107 212	160 000	58 000		58 000
Zimbabwe	54 576	64 891	49 000	47 000		47 000
					TOTAL	202 800

INDIVIDUAL COUNTRIES

WEST AFRICA

Benin: IDH figures suggest new aerial survey data have been acquired since 1981, and I have therefore taken the mean of his high and low estimate.

Ghana: IDH estimate is derived largely from an arbitrary density of 0.15/sq km applied to the entire range. I have chosen the WM figure.

Guinea: IDH estimate is based on an arbitrary density of 0.05/sq km I have chose the WM figure.

Ivory Coast: New data are available from Roth et al. (1984), and this is the same figure as the lower estimate in IDH.

Liberia: IDH mentions new information from Peal in text, and I have accepted his figure. In recent conversations with Peace Corps volunteers from Liberia, I gained the impression that little is known about numbers.

Mali: IDH mentions a survey by Robert Olivier, and further information from Olivier and van Wijngaarden. I have used the new figure.

Mauritania: I have assumed this population has gone extinct since 1981. In any case, the number is zero when rounded.

Niger: IDH estimate appears to be based on new information from John Newby, and is virtually identical to the WM estimate.

Nigeria: IDH estimate appears to be based on new survey date since 1981 and I have taken the mean of the upper and lower estimates.

Senegal: IDH estimate is considerably lower than WM and appears to be based on new aerial survey data. At the CIC meeting in Dakar on 19 April 1985 Senegal wildlife authorities estimated the number at about 50.

Sierre Leone: I have retained the WM estimated as there is no evidence of new survey data in IDH.

Togo: IDH has new information from Government authorities in Togo, and I have used his estimate.

Burkina Faso: I have accepted the WM estimate here as it is difficult to see how the survey data from Bousquet which IDH mentions have been incorporated into the IDH estimate. Bousquet advises that illegal hunting is at a high level and it is probably safer to use the lower estimate.

CENTRAL AFRICA

Central African Republic: A recent report by Froment (1985) gives the population at 19 500 ± 8 600. Both Froment (op.cit.) and Ruggiero (1984) describe extensive over-exploitation of the elephant in C.A.R., and Government authorities confirm this. The estimate probably requires the wide confidence intervals given by Froment, and the numbers will continue to decline in the near future. [Note: recent surveys by Douglas-Hamilton in July 1985 indicate that the numbers are under 10 000].

Cameroon: The IDH estimate is based on a questionnaire response by Victor Sunday Belingo, and information from Allo, Ngog Nje, and Woodford (reference not given). The largest part of the estimate arises from applying a density of 0.04/sq km to an area of 277 225 sq km, and this density is used in both the low and high estimates. The aerial survey density given for an area of 1700 sq km is 0.29, and a density of 0.23 is used under "informed guesses". The Chief of the Hunting Service, Djoh a Ndiang Issa, advises that in many cases the elephant densities are similar both inside and outside the protected areas. If this is so, and, if, as reported, the illegal hunting is not particularly severe, it is possible that the Cameroon population is considerably higher than the IDH estimate which I have used.

Chad: Prior to my arrival in Chad the authorities sent out word to all provinces asking for estimates of elephant numbers from their staff. These estimates are given in Appendix 1, and the total lies between 2020 - 2885. This is extremely low, and instinctively I would be inclined to increase any estimates based on ground counts. However, I have not done so for the following reasons:

a) The technical staff of the Ministère du tourisme et des eaux, forêts, chasses argue strongly for the estimates as given.

b) There is no doubt that there has been a catastrophic reduction of elephants in Chad since the outbreak of war in 1979. The situation is reminiscent of Uganda in the mid-1970s. I was given eye-witness accounts of complete herds being eliminated using helicopters and anti-aircraft guns mounted on vehicles.

c) There may, in fact, be good reason to accept the ground observations of the official staff. The terrain varies from Sahel to Sudanese savannah and elephant are extremely conspicious. The villagers take a close interest in the herds and are able to report fairly accurately the numbers in their vicinity. I had first-hand experience of this in an area south of N'Djamena where a large herd of elephant had appeared since the war. We travelled from village to village trying to locate the animals and received precise reports of their numbers and last sightings from each settlement. This was backed up by evidence of spoor and droppings. I got the impression that the elephant were in very little danger from the villagers: the excitement caused by their presence in the area was obvious, and it appeared that people were not anxious to see a return to the hunting situation during the war.

d) Elephants were also reported at Lake Chad and in the desert east of the lake while I was in N'Djamena, and the staff of the wildlife department thought that many herds were returning from Nigeria, Cameroon, C.A.R. and Sudan following the disturbance of the war. The drought conditions in the Sahel zone are giving rise to extensive movements of herds within the very large home ranges characteristic of this area, which overlap into adjacent countries. There is a general southward trend of both humans and elephants, and it is to be expected that elephant carrying capacity will be lowered without any hunting pressures.

Congo: The IDH lower and upper estimates for the Congo are largely derived by applying the same density (0.02/sq km) to areas of 74 185 sq km and 159 385 sq km respectively, giving 2 700 - 4 500 elephants. The WM estimate is 10 800, and the officials in the country feel the number lies between 10 - 15 000. I have gone out on a limb with an estimate of 59 000 which is derived in Appendix 2, using the method described for Zaire.

Equatorial Guinea: I have accepted the IDH estimate here, but note that there is no difference between the high and low estimate and it is arbitrarily based on a density of 0.09/sq km

Gabon: The IDH low estimate, 12 014, is obtained by applying a density of 0.09/sq km to a range of 133 490 sq km, and the high estimate, 24 028, arises by increasing this range to 266 979 sq km. The WM estimate, 13 400, and the official estimate, 14 000, both lie within the range of IDH. I have calculated a population of 48 000 (Appendix 3) using the method described for Zaire.

Zaire: This country is the large unknown factor in Africa, and there appears to be an "open season" on making estimates for the total number of elephant it contains. At the Hwange Meeting, figures varying from one hundred thousand to two million were bandied about but I cannot recall the authorities for any of the estimates. While I was in Zaire, we held a 6 hour workshop to estimate elephant numbers using a hybrid technique based on Parker (1984), and the best available local knowledge of some eight technical staff of the IZCN (Institut zaïrois pour la conservation de la nature), most of whom came from different provinces in the country.

The estimate is very high, and I will be the first to admit the arbitrary nature of some of the multiplication factors used in the calculations. However, it does have the advantage that the estimate is built up from a starting basis of the individual provinces in the country and avoids applying a "blanket density" to the country as a whole. Within the ranking systems, provision exists for adjusting estimates upwards or downwards depending on first-hand knowledge of local conditions in each province. Full details of the method used are given in Appendix 4, and the same technique has been used for the Congo and Gabon.

The technique is an adaptive method to provide information required by administrators in a hurry. We are all aware that a full survey of the number of elephant in Zaire would cost a lot of money and require years to complete. The conservation priorities in Zaire do not necessarily justify such a survey. A knowledge of elephant numbers might be better arrived at over a period of years using an "active, adaptive" method (Holling, 1978) which involves embarking on positive management schemes, making estimates of ivory production, and monitoring the outcome of such actions.

EAST AFRICA

Ethiopia: I have used the official estimates given to me by the wildlife authorities in Ethiopia (Appendix 5). WM has no estimate for Ethiopia, and IDH's estimate is based on an indirect index for about one quarter of the area, and an arbitrary density applied to the remainder of the range.

Kenya: I was informed by the authorities in Kenya that they regard the survey data from the Kenya Rangeland Ecological Monitoring Unit (KREMU) as the only official estimate. Therefore I have taken the most recent information (1983 surveys) from Stelfox et al. (1984) to derive a figure for the country as a whole. I have extrapolated from previous years to fill in the values for areas not surveyed in 1983 (Appendix 6).

Rwanda: I have used the IDH figure here, rounded up to 100.

Somalia: I was fortunate to obtain recent data from Dr. Murray Watson in Mogadishu which formed part of a consultant's report he was preparing for the Somalia Government. The estimates given were supported by the Government authorities.

Two figures based on aerial surveys in the wet and dry seasons are given: Nov/Dec 1983 - 12 773, and March 1984 - 4 476. I have used the mean of these (8 600) as the estimate.

Watson states that many elephant appear to leave Somalia in the dry season for Kenya, although to some extent the differences between the figures may reflect a change in the animals' preferred habitat within Somalia in the wet and dry seasons. Elephant are confined to clay/sand mosaics, coastal limestones overlain by deep mixed soil, the deep clays between the Jubba and Shabeelle, the eastern section of the occasionally flooded heavy clay, and frequently flooded uncropped heavy alluviums of the lower Shabeelle and Jubba valleys.

Watson feels, however, that the distribution of elephant in relation to habitats may have been modified by severe disturbances, so that their present distribution is not entirely due to ecological factors. He feels the elephant are in the process of being eliminated. The remaining herds occur in large nervous groups typical of a heavily poached population. No males bearing large tusks were seen. From an analysis of carcases, Watson estimates that between 1979 and 1982 about twice as many elephant died as now survive in Somalia. The clumping of carcases suggests the elephant were killed by well-armed commercial poachers in the same fashion as occurred in Kenya and Sudan.

Sudan: I have used the mean of IDH's upper and lower estimates. In view of recent heavy hunting (Merz, 1984) the WM figure is probably out of date. Watson et al. (1976) estimated some 134 000 elephants in the Southern Sudan and Dr. El Rayah Hasaballa (pers. comm.) feels that the total number might have been even greater. However, aerial surveys in the Shambe area of Southern Sudan by Hillman, Snyder, Tear and Somerlatte in 1981 showed significant downward trends. It is quite likely that even the IDH figure no longer applies.

Tanzania: The mean of IDH's lower and upper estimates has been used. It is important to note that the majority of Tanzania's elephant are contained in the Selous Game Reserve (some 86 000 - Borner, 1981), Ruaha National Park and Rungwa Kizigo Game Reserve (15 000 and 20 000 respectively - Borner and Severre, 1983). Douglas-Hamilton (1984a) examines the trends in the Selous, and Douglas-Hamilton (1983) discusses the general status of elephant in Tanzania.

Uganda: The mean of IDH's lower and upper estimates has been used. IDH states that there has been no new information from Uganda since the 1982 surveys.

SOUTHERN AFRICA

Angola: IDH indicates that there are no new data from Angola because of the war. For this reason, and because even 12 400 elephant is a very low number for a country the size of Angola, I have selected the WM estimate.

Botswana: IDH mentions recent aerial survey information from Melton, Moroko and Work, and I have used the mean of the lower and upper figures.

Malawi: The value used is an estimate provided by Dr. R.H.V. Bell (Senior Parks and Wildlife Officer). A breakdown of the populations in Malawi is given in Appendix 7.

Mozambique: A recent estimate from José Tello has been used. This information was obtained from Douglas-Hamilton, but has not yet been incorporated into his master tables. The breakdown into component areas is given in Appendix 8.

Namibia: I have used the figures given by Joubert and Mostert (1975). IDH's figures are clearly a computer error. Hall-Martin (pers. comm.) advises that there are no significant changes in the numbers today. The breakdown is approximately as follows:

Kaokoland	200	
Etosha NP	1200	
W. Damaraland	100	(100-150)
Remainder	500	(including Caprivi Strip)
Total	2000	(approximately)

South Africa: The figure used is the result of the latest census in 1984 (Hall-Martin, pers. comm.). This is a total count and there are no upper and lower confidence limits.

Zambia: The figures used were given to me by George Mubanga (National Parks and Wildlife Service) and are listed for each area in Appendix 9. There has been a significant decline since 1981. [A survey by Gilson Kaweche and Dale Lewis in January 1985 shows the total population of the Luangwa Valley, including GMAs, to be of the order of 25 000 animals: this is some 10 000 lower than the estimate in this report]

Zimbabwe: The estimate from Dr. D.H.M. Cumming (Chief Ecologist) amounts to 47 000 $\pm$ 3000 animals. Some 7000 will be culled in 1985 as part of a long term programme to reduce the population to about 33 000 animals. A breakdown of the populations inside the country is given in Appendix 10.

DISCUSSION

Since the IUCN/SSC meeting in 1981 some major changes in the status of elephant have occurred in certain countries. In some there have been massive reductions in populations reminiscent of events in Uganda in the mid-1970s. Chad, the Central African Republic, and the Sudan are in this category. The statistics from the ivory trade (Caldwell, 1984) and the small size of tusks being exported and used in domestic carving industries support the contention that the populations in these countries have been greatly reduced. They are no longer major ivory exporting nations.

Illegal hunting is extremely high in most of the Francophone countries which I visited, with the possible exception of Cameroon. The officials report that elephant are being reduced at a rate far greater than would be expected simply from range shrinkage in the face of human population increase. Zaire, the Congo and Gabon are in this category.

In Cameroon, Ethiopia, Kenya, Mozambique, Somalia and Zambia illegal hunting almost certainly exceeds the sustained yield of the populations. I am not sure whether this is true of Tanzania: there is no good evidence to confirm the point. A population of 200 000 animals in this country could easily support an annual offtake of about 3% (6000 animals) distributed over the age pyramid, and if the tusks exported were of an average weight of 5 kg, then some 60 tonnes could be expected to enter the international trade annually (less a certain amount for the domestic carving industries). Tanzania's official exports are on average less than 10 tonnes annually (Caldwell, op. cit.). There is nevertheless a large amount of illegal hunting in the country which the authorities are anxious to contain.

In Botswana populations appear to be increasing, and in Malawi, South Africa and Zimbabwe elephant numbers are determined largely by management policies.

Despite the fact that populations are declining in most of the African countries I visited, even in the worst affected countries elephant are not likely to become extinct in the next few years. The tragedy in certain countries is that the resource is being totally mismanaged, whether the objectives are ivory production, meat production, or tourism. Several of the countries which I visited have relatively low human populations, and have the potential to manage their elephant for a high economic yield through safari hunting or cropping (e.g. C.A.R., Congo, Gabon and Zaire). This will be discussed further in the report.

Parker (pers. comm.) has criticised the first draft of this report for its failure to examine the elephant population estimates in relation to the known volume of ivory which has entered the ivory trade in recent years. To rectify this I have examined very briefly the implications of elephant deaths from ivory trade figures between 1976 and 1984.

Year	Elephant Deaths	Source
1976	68 128	*Parker (1979 p.68): 932 tonnes.
1977	56 140	*Parker (1979 p.68): 768 tonnes.
1978	51 681	*Parker (1979 p.68): 707 tonnes.
1979	32 982	Caldwell (1984) Hong Kong and Japan only.
1980	56 335	Caldwell (1984) Hong Kong and Japan only.
1981	52 240	Caldwell (1984) Hong Kong and Japan only.
1982	55 213	Caldwell (1984) Hong Kong and Japan only.
1983	47 076	Caldwell (1985) : 644 tonnes.
1984	26 059	Caldwell (1985) : 356.5 tonnes.
TOTAL	403 395	

* - the number of animals has been derived from the tonnage by assuming a mean tusk weight of 7.2 kg (Caldwell 1985) and 1.9 tusks per elephant.

I am well aware that these data may have omissions, but have used them simply as a starting point to test whether the order of magnitude of elephant population estimates for Africa as a whole could possibly support such a offtake. The lower level of population estimates are about 1.2 - 1.3 million animals, and so I have examined what this implies for elephant populations capable of growth rates of 3, 4 and 5% in the absence of hunting.

Initial Estimate	Potential Rate of Growth	Net Rate of Growth	Final number
1 200 000	5%	0.98%	1 305 395
1 300 000	5%	1.37%	1 460 528
1 200 000	4%	-0.22%	1 176 045
1 300 000	4%	0.16%	1 318 377
1 200 000	3%	-1.32%	1 056 927
1 300 000	3%	0.96%	1 187 404

The results suggest that the order of magnitude of the population estimates are totally compatible with the ivory offtakes. The modelling tends to rule out estimates greater than 1.3 million because the population capable of growing at as low a rate as 3% per annum would be increasing under the harvesting regime, which does not appear to be happening. The lower limit is about 800 000 animals coupled with a 5% growth rate which produces a net apparent decline of -1.6% per annum.

There is a need for better inventory data on the elephant populations of Africa. At one time I was convinced that this was an essential prerequisite to any sound management programme. Now I am less certain. It seems to me that census work should not become an all-consuming task, and that there are higher priorities for allocation of resources. The present state of knowledge of elephants in Africa can be summarised as follows:

a) Most countries in Africa have significant elephant populations which are in no immediate danger of extinction.

b) Elephant numbers appear to be declining faster than is required to provide land for expanding human populations, taking into account the rate of human increase on the continent.

c) The causes of the decline are not simply a high trade value of ivory, or an expanding human population, or the irrational greed of "poachers". There are fundamental socio-economic problems regarding the ownership of the resource, disparate values of ivory in different countries, and major administrative shortcomings which all contribute to the problem. Internal improvements in these last three aspects are needed to bring the situation under control.

There is little point in spending large sums of money solely to chronicle the steady reduction in numbers. A knowledge of the decline will do little to prevent that decline. Worse still is the attitude that only after an accurate survey of numbers has been done, will it be possible to consider the next steps in management - an attitude which I encountered in more than one country. Perhaps accurate estimates of numbers are only required in those countries with problems of vegetation damage caused by over-populations of elephant and in which reductions are planned.

After travelling through a number of countries, I am left with the feeling that in some of these we should relegate census work to a lower priority, and begin considering adaptive management strategies. These may ultimately provide better estimates of the number of animals as a secondary "spin-off" of positive, well-designed programmes to bring elephant utilisation under the firm control of wildlife authorities in their respective countries.

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2. ESTIMATING IVORY PRODUCTION AND EXPORT QUOTAS

INTRODUCTION

The following is quoted from the initial proposal by the CITES Secretariat for this consultancy:

> "Control of the ivory trade has been the subject of considerable discussion for many years, both within CITES and in other circles, and it is widely felt that current controls are inadequate and that there needs to be substantial improvement in the effectiveness of CITES procedures in this respect.
>
> At the third meeting of the Conference of the Parties (New Delhi, India, 1981) a Resolution (Conf. 3.12) was adopted calling for certain measures to be taken with respect to ivory trade controls, including the individual marking of tusks. These measures have been only partially implemented thus far and, although successful to some extent, they have not brought about the desired degree of control.
>
> At the fourth meeting of the Conference of the Parties (Gaborone, Botswana, 1983) the topic was again the subject of much argument, and in view of the complexity and scope of the issue it was agreed that the CITES Technical Committee would devote a large proportion of its first meeting to formulating proposals to improve the situation."

At the FAO Working Party on Wildlife Management and National Parks held in Arusha, Tanzania, in September 1983, 24 African states passed a resolution calling for the proper control of the trade in African ivory and calling upon producer countries to have an annual export quota for ivory.

A similar resolution was adopted at the CITES Technical Committee meeting in Brussels in June 1984. A draft Resolution of the Conference of the Parties was submitted to the CITES Secretariat in November 1984 and was subsequently accepted with revisions at the meeting held in Buenos Aires in April 1985 (Appendix 11). This Resolution calls for the introduction of a system of export quotas based on a number tusks for each ivory producing country, which will limit the quantity of legal ivory available to consumer countries.

The CITES Secretariat views the success of the new measures as depending on three major factors. Firstly, the quotas set by each African country must be realistic and must be based on the best available information on elephant population numbers and their anticipated utilisation. Secondly, there must be well defined control procedures centred on the CITES Secretariat. Finally, the co-operation of all major consumer countries must be assured in recognising the new system.

APPROACH

In all countries which I visited the first question I asked was "Do you really want this system?". This generally led to a discussion about the pros and cons of the quota system. The chief advantage that emerges by almost universal consensus is that countries who have no elephant will have no export quota, and this should lead to the desirable situation where each state exports only ivory originating in its own country. Conservation issues aside, this would be a major improvement in the current situation.

The second advantage of the quota system lies in its implications for internal management in each ivory producing country. It should encourage the authorities to look critically at the process by which ivory finds its way from the elephant in the bush to the export market, and to adjust policy decisions in light of their findings. Over a period of years this could lead to improved management of the resource through a process of annual revision. Quotas would be set at the start of the year, results evaluated at the end of the year and estimates revised for the following year. At each stage the technical authorities have the opportunity to design adaptive management programmes that will improve their knowledge at the end of the year.

A third advantage is one that was not obvious to me at the start of the project, but became clearer as I visited more countries. Many government agencies favour the application of a quota system in order to strengthen their own internal position with regard to the ivory trade. At present most wildlife departments are not particularly powerful within their government hierarchies, and frequently find themselves forced to acquiesce to demands for export permits whether they like it or not. However, when the matter becomes one of international concern their position is quite different and they can confidently point to the regulations binding CITES Party states.

A possible disadvantage of the system is that it may lead to unwarranted interference from some non-producing countries and certain conservation lobbies when the quotas are finally tabled and circulated. Value judgements may be made as to the size of the quota, and this may end up being a source of harassment for the producer country. In this regard, almost every country I visited expressed the strong view that they would not be prepared to tolerate undue infringement of their sovereign rights in the matter.

A weakness in the system is the expectation that by setting a quota, the number of elephant killed in the country concerned will automatically be adjusted to that quota. This wishful thinking exists both among producer and non-producer countries. It is possible that over a period of time it will become more difficult for illegal ivory to enter the international trade because of the quota system, but it is doubtful whether the quota system *per se* will do anything to prevent illegal hunting. In many countries almost all the illegally hunted ivory enters the domestic carving trade and no export quota system addresses the problem. In others, the wildlife authorities tend to concern themselves solely with the resource inside gazetted protected areas and regard their role as one of controlling international safari hunting. Ivory which originates from unprotected areas in the country is not registered, marked or recorded by the authorities, either in the area where it originates or when it reaches a main centre. Whilst the authorities may find themselves obliged to issue an export permit for such ivory, the trade basically remains in private hands from the point of origin of the tusks to

the point of export. This is a key issue and can only be addressed through internal administration. The quota system may even be counterproductive in such countries: when private dealers approach the authorities for an export permit and are told that this is not possible because their shipment has not been catered for under the established quota, their reaction may be to resort to illegal export, or to stockpile until their ivory can be legalised.

Despite these reservations, I found all countries strongly in favour of the system. In their view the advantages outweigh the disadvantages.

There was some confusion about the interpretation of the word "quota". A few authorities were worried that, having set a quota, they would be obliged to export the full amount stated. This introduces an important point. **The word "quota" is not appropriate in the sense in which it is employed in this context.** From the producer countries point of view, what is intended is an estimate of ivory which will enter the international trade in any given year, and any connotation suggesting satisfying the consumer market should be avoided. The essence of the system is that it is a mechanism through which producer countries can call into play on their own behalf the policing and control facilities of other member states of CITES to assist them in their own objectives of controlling exports.

In the proposal for this consultancy, the CITES Secretariat talks of limiting the quantity of legitimate ivory available to consumer countries. Care must be taken that the quota system does not become a two-edged sword: if consumer countries demand that quotas are fulfilled the system will be counterproductive for conservation.

There was also confusion about who would set the quota, and in some countries the authorities thought that this would be done by CITES. Here too the word quota is inappropriate because it carries a suggestion that CITES has the power to limit quotas for individual producer countries. This is not so - the prerogative rests entirely with the authorities of the country concerned. In some countries I was left with the impression that they would have been happier for an outsider to set the quota: perhaps because they felt this would relieve them of the pressures that will undoubtedly fall on their shoulders when their quotas do not coincide with the desires of ivory exporters.

In each country I pointed out the desirability of using biological knowledge and positive management policies to estimate ivory production. The remainder of the world might well be justified in questioning the size of the quota if it was simply derived by looking at the previous year's exports and arbitrarily stating the same figure, or adjusting it upwards or downwards without any scientific basis. I offered to assist by running through a "dummy exercise" in setting the quota if they wished to do this, using the methodology which is explained later in this chapter. I stressed however, that the figures should not be taken and used without further in-depth consideration, and in certain aspects better data should be obtained before the required date for quota submission. I also assured the authorities that I had no intention of publishing the result of this exercise as a "desired" quota for the country.

I have counselled against setting "wishful" quotas in all countries. Whilst the authorities might hope that by setting a low quota the number of elephant dying may decrease, there is little point in this if it results either in the trade going "underground", or in vast surpluses of ivory accumulating which the country is reluctant to export in order to save face having stated a

certain quota. Ivory is money, and an agency might justifiably be accused of financial mismanagement if the proceeds from this resource remain blocked for any length of time. Ten tonnes of ivory are worth about a million dollars and the interest alone on such an amount is sufficient to provide a substantial proportion of the running expenses for most wildlife agencies. It would be better to overestimate the quota than to underestimate it: there is no obligation to export the full amount, and in any case provisions exist for extending the quota in any given year.

At an early stage it became apparent that many of the most fundamental principles involved in harvesting elephant populations were not widely known. As a result of this, where time permitted, I preceded the quota setting exercise with a short discussion of the limits to which elephant can be exploited, and optimum strategies for different management objectives. This forms the basis of the next section.

PRINCIPLES OF MANAGEMENT

Pilgram and Western (1984) discuss various strategies for managing elephant populations for maximum sustained ivory harvest and two important principles emerge from their work.

a) The sustained yield of ivory derived from natural mortality in a stable population is the maximum harvest. There is no long-term cropping strategy that can produce more ivory. It is more profitable to collect the heavy tusks from a few old animals dying than to harvest any number of animals which have not reached the normal age of death.

   This is a result of the exponential growth curve of male tusks. Unlike a butchery strategy for cattle, where the optimum is to slaughter animals at the point at which they cease to gain body weight (or even slightly before this), in the case of elephant the maximum ivory return is obtained by allowing them to live their full life.

   Parker and Bradley Martin (1982) state with regard to natural mortality in stable man-free circumstances that "if all such ivory could be recovered, it would be sufficient to meet most of or even exceed the current world demand." But it is not clear from their paper whether they realise that the harvest from natural mortality may, in fact, be the **maximum** theoretical harvest.

b) Any attempt to maintain an ivory harvest greater than that provided by the natural mortality in a stable population, whether by random killing or by selective hunting for larger tusks, ultimately results in the extermination of the population. This results from the increasing numbers of animals required in each successive year to sustain the same weight of offtake.

   Whilst this might not, at first sight, appear to be the sort of strategy that any responsible wildlife authority would consider, it may be the de facto situation in certain countries in Africa.

   A constant harvest of ivory can be achieved by specifying a certain number of animals to be harvested annually (provided this is within the sustained yield capability of the population), but this will not exceed the harvest from natural mortality in a stable population.

The above two points apply to the case where a population is being managed for maximum ivory return, and are a strong economic argument. The argument is further enhanced by the fact that the price per kilogramme of ivory is far higher for large tusks, and by the fact that while waiting for males to reach their terminal age they can be earning valuable revenue as a tourist attraction. The key assumption in the above is that of **a stable population**, and the practicalities of such a state are discussed below.

In modelling elephant populations, perhaps the most critical parameters are the fecundity of breeding females from the ages of 15 to 45 years, and the mortality over the same range (provided there is not an excessive neonatal mortality). In the course of modelling the elephant population in the Luangwa Valley, Hanks and McIntosh (1973) found that, of all the reproductive homeostatic mechanisms, changes in the calving interval (fecundity) had the

greatest effect on the growth of the population. If stability is achieved with a very low fecundity and a very low mortality, production of animals (and hence ivory) will not be high. Obviously, for maximum production the higher the fertility the greater is the potential. A stable population arising from high fertility and high mortality will be most productive. However, such a hypothetical population ignores the known mechanisms which elephant possess for self-regulation. Unfortunately, there are very few documented cases of stable populations much less an analysis of the fecundity and mortality in them. Laws et al. (1975) carried out a detailed study of the population dynamics of the Murchison Falls National Park population, but this was actually declining at the time. A feature of the population was a very low fecundity combined with high mortality.

I have modelled a stable population by beginning with mortalities and fecundities calculated for the MFNP population (Laws et al., op. cit.). Initially this resulted in a declining population, and I adjusted the fecundity upwards and the mortality downwards until stability was achieved. Over the middle range the fecundity used was 0.2 calves per adult female per year and the mortality in each age class was 0.03 animals per year. Using the tusk weight formulae given by Pilgram and Western (1983) for East African males and females, I examined the implications of a stable population of one million animals. My estimate for the total ivory produced from natural mortality was some 670 tonnes per annum. The mean tusk weight for males was 12.6 kg and for females 3.4 kg, giving a combined mean of 8 kg. This is not far from the requirements of the international trade (700-800 tonnes per annum - E. Bradley Martin, 1983). However, it is totally impractical to expect that all of Africa's elephant populations will ever be in a stable state with these particular population parameters at the level of one million animals: it will not happen.

A stable population is assumed to arise when populations are at ecological carrying capacity. In Africa very few populations appear to be anywhere near such a ceiling. Vegetation damage is occurring in the Chobe National Park, Botswana (Clive Walker, pers. comm.) and Ruaha National Park, Tanzania (Borner and Severre, 1983), but this does not mean that the animals, if undisturbed, will not increase to even higher levels. When considering stability for elephant populations due thought must be given to the very large time lags involved before the effects of self-regulation are evident.

Very often populations exceed the desired level and further reduce the carrying capacity of the land before any overt signs of regulation are manifest. Caughley (1974) argues that perhaps elephant are not regulated in a steady-state condition of constant numbers but undergo long term cycles in response to their own effects on the environment. All of this is somewhat hypothetical - few elephant populations are being given the opportunity to test it out. With the present hunting regimes in Africa, populations are likely to be well under carrying capacity, and even if all illegal hunting ceased, it is doubtful whether the range is available to allow them to increase arbitrarily to some undefined limit where they reach carrying capacity and hence stability.

Let us assume that the population of elephant in Africa is one million animals, and that this is well below the carrying capacity. If hunting pressures were to be removed the animals could be expected to increase rapidly towards some distant ecological carrying capacity. Natural mortality should be low and fecundity high. Assume that the number is initially below one million animals and by the time it passes the level of one million, it has achieved a stable age structure. In the year that it exceeds one million it is of

interest to consider the ivory harvest arising from natural mortality alone. I have modelled this using parameters derived from a fast growing population in Zimbabwe (R.B. Martin - Ph.D thesis, in prep.) with a fecundity over the middle range of 0.25 calves per adult female per year and a mortality of 0.01 animals per year in each age class, giving a rate of growth of 5%. Using the same technique for estimating the ivory production as above, the outcome was 200 tonnes in the year in which the population reached one million animals. Mean tusk weights were 11.3 kg for males, 3.1 kg for females, and 7.2 kg overall. The low mortality gave rise to the low production. Using the same approach but adjusting the parameters to give a 3.6% growth rate (0.22 calves per adult female per year and 0.015 mortality in the middle range), the production rose to 300 tonnes, with the same mean tusk weights. If by some miracle all illegal hunting could be stopped, and everyone stood by to wait for the bonanza from natural mortality, they would be disappointed. The first thing that would happen is that the elephant populations would begin to increase rapidly, and it would be a long time before stablisation occurred and yields of ivory from natural mortality began to rise.

Now let us consider the application of culling to stablilise the population artificially at one million animals. The management strategy used in the model was to remove sufficient animals from the breeding herds to cause the population to level off. All females were reduced in the proportion in which they occurred in the population, and males which would have been in the cow herds (I assumed under 12 years old) were similarly treated. Males above 12 years old were not affected. Natural mortality was assumed to operate in addition to the culling. This is not an unreasonable assumption in such a case: there is always a certain level of natural mortality arising from such factors as accidents, disease and predation which are unrelated to density-dependence. In the case of the population described above which was increasing at 3.6%, the annual harvest rose to 765 tonnes (Mean tusk weights: males 15.2, females 2.7 combined 8.8 kg). In the case of the population increasing at 5% the harvest was 784 tonnes (Mean tusk weights: males 15.6, females 2.4, combined 8.8 kg).

Having gone this far, I could not resist testing to see whether some hunting of the males over 45 years old could produce any addition to the harvest. I found a very slight improvement could be had by harvesting about 5% of the males in this class, raising the total harvest to 790 tonnes. I have no doubt that additional improvements could be made with further manipulations of the data and the management strategies, but time did not permit this. A run subjecting both males and females to the same culling treatment actually reduced the ivory harvest, and it is clear that all management for ivory must be directed towards maximising the number of males in the upper age classes.

Both the above management strategy and that of Pilgram and Western (op. cit.) assume that all the tusks from natural mortality will be found. Parker (1979) gives examples of finding rates and these are generally low (about 6% of what is available: however, Bell, in reviewing Parker (1979), recalculated the finding rates from Parker's data to about 25%). Parker found that some 20% of tusks in the trade came from natural mortality: my suspicion is that this proportion would be far lower today. In the tusks I examined in several ivory stores in African countries, I found very few tusks which satisfied the criteria given by Parker (op. cit.) for recognising natural mortality. It would be impractical to demand that all African ivory were recovered after the animals died naturally: inevitably an enterprising hunter would speed up the process. However, the important principle is that only the oldest males should be hunted and if the hunting pressure is more than a low percentage the ivory harvest will decline. This is a relatively easy process to monitor: the average weights of tusks taken on safari hunting are a good guide to the degree of exploitation.

Of course, not all elephant populations are being managed for economic reasons, and it might appear that the above arguments have limited application. Culling is normally carried out when populations exceed the desired carrying capacity simply to reduce numbers and protect vegetation. However, it is interesting that a culling strategy used for conservation reasons is probably the optimum for ivory production also.

The last series of modelling tests that I carried out was to examine the effect of demanding a constant harvest of ivory from a fast growing population using selective hunting for the largest tusks. This is probably closest to the situation pertaining in Africa today. The degree of selectivity was directly proportional to the weight of tusks in each age class, and I used Pilgram and Western's regression formulae for East African ivory. I found that at a level of one million animals a harvest of slightly over 400 tonnes could be sustained. At this level the population growth rate was effectively zero. The initial rate of growth of the population was not particularly critical: the two populations defined above which without hunting would grow at 5% and 3.6%, and a further populations with a growth rate of 2.3%, all sustained a harvest greater than 400 tonnes with small differences caused by the amount of natural mortality. The mean weight of male tusks was 4.5 kg and the overall mean was 3.6 kg, which is considerably lower than those in the trade at present.

Some interesting points emerged from the modelling. Starting with the stable age distribution generated before the hunting started, the population was extremely resilient and took 25-50 years to arrive at a new stable age distribution under the harvesting treatment. Despite the fact that these populations were only capable of a growth rate of between 2.3-5% when not hunted, they could sustain offtakes of just under 7% when at the point of maximum sustainable harvest. This is an artifact caused by the new shape of the age pyramid: there is a preponderance of juveniles in the population which gives rise to an apparently high rate of reproduction. However, if the hunting pressure is removed the rate of increase reverts back to that which was initially defined. Parker and Bradley Martin (1982) in their paper "How Many Elephants are Killed for the Ivory Trade" state that percentages as high as 4.1% are "within the theoretical capacity for an elephant population to sustain". This model confirms the point.

As 400 tonnes is less than the harvest required by the trade, I examined sustainable harvests from populations of 1.5 and 2 million animals. As might be expected, the harvests rose to 600 and 800 tonnes respectively.

I then examined the effects of trying to take a harvest of more than the sustainable amount from a population capable of a 5% growth rate in the absence of hunting. In doing this the starting conditions of the model greatly affect the end result, and there are a wide range of options which can be tested. I will deal only with two. The first involved taking a population of 2 million animals with a stable age distribution generated from an 800 tonne harvest which it could sustain, and then increasing the harvest to an amount slightly in excess of 800 tonnes. It took 34 years to decline to 1.5 million animals, a further 6 years to reach 1 million and a further 5 years to become extinct. The second involved subjecting a population of 1 million animals growing at a rate of 5% with a stable age distribution to a harvest of 750 tonnes annually. The population continued to increase for 22 years and peaked at just under 1.5 million animals before beginning to decline. It took a further 14 years to fall back to the level of one million and then crashed in 7 years.

The results from these constant harvest models lead to some interesting debate, and the whole debate hinges on the presumption that the model is somewhere near correct. If we consider the fact that the amount of ivory in the trade has been 600-800 tonnes for the last four years and the mean tusk weights are higher than those which I find by modelling to be the limits of a constant harvest, it is tempting to conclude that the present estimates of the African elephant population are too low. Only a population of some 2 million animals could sustain such a harvest. I have assumed East African tusk weights for the calculations and these are probably higher than in other elephant populations in Africa which would further strengthen the argument: the lower tusk weights it would require more animals to provide the harvest. The number of animals providing the tusks in trade to Hong Kong and Japan in 1983 was 67 000 (Caldwell, 1984). The highest offtake of animals that can be sustained at a population of 2 million is about 130 000. There is only one flaw in this argument, but it is sufficient to invalidate it. If the population of Africa was 2 million animals and was being subjected to a harvest of 750 tonnes per annum, it would not only be able to sustain it, it would be increasing at a rate of 2-3%. And we can be fairly sure that this is not happening. The decline documented by numerous surveys is good evidence (Douglas-Hamilton, 1984b).

This led me to search for a scenario which satisfied the following conditions:

a) The population must be declining.
b) The offtake must be 750 tonnes per annum.
c) The number of animals providing this offtake must be about 70 000.
d) The mean tusk weight must be about 6 kg.

By iterative modelling, I arrived at a solution which satisfied all the above criteria. The correct conditions occurred when I allowed harvesting to begin on a population of 750 000 animals with a healthy age structure. The population rose to about 1 000 000 animals despite the offtake and then began to decline. At the point at which it fell below 800 000 animals all the above conditions were satisfied. The process took about 30 years from inception of the harvest and gave a current population of about 800 000 animals declining at a rate of 1.8%. The age distribution was unstable and at this rate of offtake the population would crash in less than 10 years.

Before spreading alarm and despondency, let me repeat that this a model which may have errors in it, and does not take into account numerous factors which could affect the situation. Caldwell (1985) has revised his estimate of the number of animals killed for the ivory trade in 1983 to about 47 000 and the figure for 1984 has dropped to about 26 000. At the same time no allowance has been made for the illegal export trade or internal carving industries in producer countries.

Bearing in mind the preceding, what principles should be adopted for setting quotas? The modelling which I have carried out was completed after visiting the producing countries, and I did not have the benefits of its results at the time. If I am to believe the results then it is very clear that an annual production of 750 tonnes of ivory is not going to be sustained for long and therefore quotas should be set in a manner which attempts to redress the situation. During my trip I gave the following guidelines which are probably still appropriate:

a) If a population of elephant is being managed for sport hunting (i.e. large tusks), then the percentage of animals allowed on licence each year should not exceed about 0.5% of the total population.

b) Offtakes of up to 2% from the male sector of the population will not seriously affect its status, although the long term yield of ivory will not necessarily be higher.

c) For maximum yield from a population below carrying capacity, culling operations which affect the breeding herds only are probably the optimum. Provided the offtake is a "slice" along the edge of the age pyramid taking all age classes in the proportion in which they occur in the population, the shape of the age pyramid will remain unaffected and males can be managed for maximum ivory production. Offtakes of up to 5% will not cause the population to decline. (The above models confirm that this gives the highest yield for a population below carrying capacity.)

d) A heavy yield from selective hunting should be avoided. (Modelling shows that populations can certainly survive up to 6% in this manner, but it does not produce the most ivory, and is the most disruptive to populations.)

The next section deals with a methodology for estimating the number of animals dying each year, the amount of ivory they produce, and the export quota derived from this ivory.

METHODOLOGY

In order to make a final estimate of the number of tusks which a country will have available for export, it is necessary to go through a number of distinct steps. It would be convenient if the quota could be simply evaluated by taking a proportion of the total population of elephant, but if this were done the result would probably overlook a number of factors. The methodology presented may appear far too complicated, and it may be thought that few countries will have the information necessary to complete the exercise. I will argue strongly against this. It may well be that in the first year few countries will have accurate data either of elephant numbers or of the factors affecting those numbers. However, I believe that the quota system should be aimed at improving elephant management in Africa over a number of years, and this objective will not be served by beginning with a method that does not cover all ramifications. The methodology outlined here clearly identifies the vague areas involved in reaching a final figure, and these need to become the subject of research while the quota system is in operation. Indeed, the simple overt decision of opting for a quota system has brought to the fore many questions which I believe have never been fully addressed before.

In the first chapter I mentioned the need to move towards a system of active, adaptive management. The act of setting an export quota for ivory provides a very good opportunity to put this into practice. No technical person completing the quota setting exercise which follows should be alarmed at the fact that he may not know the right factors to use at each step of the calculation. The right approach is to make an estimate - even if it is an outright guess - and see what happens at the end of the quota year. The estimate can be revised and improved for the following year. But most important of all, during the year data recording systems should be put in place which will permit the initial estimates to be examined. The initial estimate and the final outcome must be compared in order to make better estimates in the following year.

Many factors affect the amount of ivory available for export in any country, and each country has differences in policy which need to be taken into account. I began this trip armed with a pro-forma sheet for setting quotas which might have worked in Zimbabwe but did not cover all the contigencies in the rest of Africa. By testing the method in many countries, the shortcomings in my initial system were exposed, and what is shown here should be a considerable improvement. In those countries where the technical authorities worked through the earlier exercise with me, this final set of procedures should present no great problem. For people reading this for the first time, I have tried to present a clear and sequential set of steps which arrive at a final export quota.

Summary of Method

The following is a brief summary of each step in the process:-

1. Estimate the number of animals expected to die in the quota year.

2. Estimate how many of these deaths will be officially recorded (i.e. the tusks will be registered by government authorities).

3. Estimate how many of the animals will bear tusks (i.e. how many are not juveniles).

4. Estimate the number of tusks (i.e. allow for animals with one or no tusks).

5. If the country has a minimum size of tusk for export, estimate the number of tusks which are above and below this limit.

6. Estimate the number of tusks likely to be confiscated by the authorities in the quota year, both those originating in the country and those originating from the neighbouring countries. Once confiscated they become legal for export.

7. Estimate the stocks of ivory held over from the previous year, both in government and private hands, which may be exported in the quota year.

8. Estimate the total number of tusks available in the year of the quota by summing the above (Steps 4 + 6 + 7).

9. Estimate the number of tusks which will be used in the domestic ivory carving industry within the country.

10. Deduct this from the total number of tusks to obtain the **EXPORT QUOTA.**

11. Deduct the number of trophy tusks from sport hunting to end up with the number of tusks expected to enter the trade.

I have prepared two forms to be used in estimating ivory production. The first **(Form** Q1) is used to estimated the number of animals expected to die in the course of the quota year, and the number of tusks they will produce. The second **(Form** Q2) is used to estimate the number of tusks which will be exported. Each step in the method is now discussed in detail.

ESTIMATE OF IVORY PRODUCTION AND EXPORT QUOTA

FORM Q1: ESTIMATE OF ANIMALS DYING IN QUOTA YEAR

COUNTRY ..... YEAR ..... SHEET ... OF ...

Minimum export weight of tusk (if any) [ ] Kg.

AREA OF ORIGIN	POPULATION ESTIMATE	CAUSE OF DEATH						TOTAL DYING
		NATURAL	MANAGEMENT				ILLEGAL	
		NATURAL MORTALITY	CULLING	CROPPING	SPORT HUNTING	CONTROL HUNTING	ILLEGAL HUNTING	
SUB-TOTAL FROM PREVIOUS SHEETS								
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
TOTALS	A	B	C	D	E	F	G	H

FINAL PAGE ONLY % of population dying in quota year (100 x H/A) [ ]

Finding Factor [ ] [ ]

DEATHS OFFICIALLY RECORDED	I	C	D	E	F	J	K
Factor: no. with tusks	[ ]	[ ]	[ ]		[ ]	[ ]	
ANIMALS BEARING TUSKS	L	M	N	E	O	P	Q
Factor: no. tusks/animal	←		[ ]		→		
TOTAL NO. OF TUSKS	R	S	T	U	V	W	X
Factor: no. tusks > limit	[ ]	[ ]	[ ]		[ ]	[ ]	
NO. TUSKS ABOVE LIMIT							Y

NO. TUSKS BELOW LIMIT [Z]

Totals from boxes X, Y, Z are carried forward to Form Q2.

Form Q1: Estimates of elephant dying in quota year.

1. Areas containing elephant:

The country should be subdivided into the areas containing elephant populations. The approach here should be to list as many areas as is necessary to allow for differences in the factors affecting the elephant populations. For example, one might begin by listing each National Park, Game Reserve, and official hunting area, and end with those areas which have no special status but nevertheless contain elephant. Provision is made on the form for 25 areas to be listed under **AREA OF ORIGIN.** In countries such as Zambia and Tanzania a second sheet may be necessary to complete the list, and this is provided for: sub-totals from the first sheet can be brought forward to a second sheet. The lower part of the form labelled **FINAL SHEET ONLY** would be completed on the second sheet in cases such as this. In general it is preferable to subdivide the country into the smallest units possible at this stage of the exercise.

2. Estimates of elephant populations:

An estimate of the number of elephant in each of the areas listed in Step 1 should be entered in the column **POPULATION ESTIMATE.** At the risk of being tedious, I will repeat that any estimate is better than no estimate, and the fact that accurate numbers may not be known for any particular area is not a good reason not to make an informed guess.

3. Causes of death:

Under the heading **CAUSE OF DEATH** there are three subheadings, dividing elephant mortality into three main classes:

NATURAL - old age, starvation, disease, predation, fighting and accidents.

MANAGEMENT - deaths resulting from policy decisions and planned operations.

ILLEGAL - deaths caused by hunting without official permission.

The section **MANAGEMENT** has been further subdivided into four types of management which are defined below:

a) **CULLING** - the killing of elephant for conservation reasons. Damage to habitat is the usual reason for this action. Culling may take the form of a major reduction to bring the population to a new lower level, or it may only involve killing sufficient animals annually to prevent any further population increase.

b) **CROPPING** - the killing of elephant for economic reasons. All elephant populations can sustain a certain offtake without declining, and whilst there are no countries (that I am aware of) practising cropping officially at the moment, this category may have important applications in future management.

c) **SPORT HUNTING** - the killing of elephant as a recreational pursuit. This category covers both international tourists and local residents hunting on licences issued by the authorities.

d) **CONTROL HUNTING** the killing of elephant to protect agricultural crops, fences and humans.

4. Estimating numbers killed for each area under each category:

The following are a set of guidelines for estimating the numbers of elephant which will die under each category of CAUSE OF DEATH. At the end of each section I have given an arbitrary "rule" for those who require it.

a) NATURAL MORTALITY: At this stage we are interested in predicting the number of animals which will die naturally during the quota year - whether or not the tusks from such animals will be recovered. Animals should not be included here which die from wounding by hunters. To perform this task in a truly scientific manner it would be necessary to have accurate figures on the age structure of the population and the age-specific mortality. It is doubtful if this exists for any elephant population in Africa.

Laws et al. (1975) calculated high mortalities for the very dense population in North Bunyoro (5 - 6.5% overall). Levels such as this probably only occur in populations which have not been hunted and are severely in excess of carrying capacity. Douglas-Hamilton (1973) gives a figure of 10% for mortality at birth and 3-4% thereafter for Lake Manyara population, which is at a high density. Hanks and McIntosh (1973) in models of the Luangwa elephant considered three levels of mortality over the major part of the age span: low (1%), medium (1.5%), and high (4%). Natural mortality is generally very low in populations which are hunted, and this probably applies to most of Africa. In my own work on a sample of data from a fairly "young" elephant population in the Sengwa Wildlife Research Area mortalities appear very low: some 2-3% at birth and about 1% during the major part of life. In an analysis of causes of death from the elephant deaths register at Kasungu National Park in Malawi, Richard Bell and I found that tusks recovered from natural mortality amounted to about 1% of the estimated population. The ground coverage in the Park is relatively high and most deaths could be expected to be recorded.

When a mortality curve which is high at birth and high in the last years of life is applied to a typical age pyramid of an elephant population what can be expected? Although mortality is high for old animals there are few of these and they will not contribute that much to total numbers. In the middle range the mortality is low but numbers are high. Among young animals numbers and mortality are high, but few carcases are found, being harder to see and often destroyed by predators. My feeling is that the best approximation for the purposes of this exercise is to apply a flat percentage to the total number of animals of the order of about 1%, and hope to revise this with better information over a period of years.

Rule 1: use 1% for natural mortality unless you have a better figure.

b) CULLING: Culling of elephant is practised only in Zimbabwe and South Africa at present and the numbers to be killed are decided largely on a basis of the relationship between elephant densities and degree of damage to vegetation. For example, in Hwange National Park, Zimbabwe, which is a low rainfall area (400-600 mm), it is considered that vegetation damage becomes severe wherever elephant densities exceed 1 per sq km and the current culling programme entails reducing the population from some 18 000 to about 13 000 to achieve this density. The problem is further complicated by an uneven distribution within the Park caused by water availability. In the Zambezi Valley a density of 0.7 per sq km is used as a guideline for culling in the mopane/miombo complexes.

The grounds for culling depend on policy towards the conservation of woodlands and estimates of "damage" to those woodlands in light of stated policies. In general, the carrying capacity for elephant declines with mean annual rainfall and soil fertility.

c) CROPPING: The principles of harvesting elephant populations discussed earlier in this chapter apply here. The percentages apply to the population as a whole, not simply adult males.

Rule 2: Do not exceed 0.5% if you are managing for maximum ivory yield.

Rule 3: Do not exceed about 2% if you are killing only adult males. This should ensure some males reaching the oldest age class.

Rule 4: The maximum sustained yield is about 5% when applied to all age classes of the population. It is better to kill entire breeding herds at this level of offtake rather than hunt selectively.

d) SPORT HUNTING: **Rule 2** above applies to populations in which elephant are being managed entirely for large trophy tusks.

e) CONTROL HUNTING: Two factors influence the number of animals which are shot on control hunting. The first is the degree of demand from rural farmers who want their crops protected, and the second is the limit to which the authorities are prepared to go in acceding to those demands. Some countries have a policy whereby males carrying very large tusks may not be shot on control hunting (e.g. Zimbabwe), while others shoot the offending animal regardless of sex or size (e.g. Tanzania). In Malawi funds from the ivory shot on control hunting are used to augment the departmental budget and there is a strong incentive to hunt animals with large tusks. The killing of animals for crop protection is frequently the most wasteful form of resource use and not always the most effective deterrent to crop-raiding (Bell, 1985a). Such animals could realise far more through the safari hunting industry, or through being allowed to die naturally to produce the maximum weight of ivory. However, there is no doubt that elephant can cause enormous damage to crops, and failure to respond to demands may lead to illegal hunting. The best method of estimating figures in this column is to rely on past history of control hunting in each area listed. It is important that an accurate reporting system is put in place for this purpose.

Rule 5: To determine estimates for control hunting check the past records in the ivory register for the area concerned.

f) ILLEGAL HUNTING: The estimation of numbers taken by unlicensed hunters is difficult, but not impossible. Whilst the ivory from successful illegal operations will not form part of the legal export quota for a country, nevertheless it is important to assess the numbers killed because of their effect on the remainder of the management programme chosen by the country concerned.

Animals known to have died from wounding by poachers should be included in this category (animals dying from wounding in the other management categories are added to those categories).

Estimates can be made using a knowledge of carcases found in the field, or by comparing the internal statistics of ivory exports with those from importing countries, and using the difference as a measure of illegal hunting. Finally, in the absence of any data, a totally arbitrary guess is better than nothing: apart from ivory recovered from wounding (above), illegal hunting will not contribute to the export quota.

5. Number of animals dying in quota year:

The rows and columns of the table should now be summed to give the following totals in the lettered boxes:

B - Natural mortality.
C - Culling.
D - Cropping.
E - Sport hunting.
F - Control hunting.
G - Illegal hunting.

H - Total of all the above.

This completes the first part of the quota form and now the section labelled **FINAL PAGE ONLY** is evaluated. The first stage in this is a check on the proportion of the population killed in the quota year, obtained by dividing the number dying by the population estimate (100 x H/A %). If this is greater or less than desired, it may be necessary to revise some of the estimates under MANAGEMENT (because this is the only section over which the authorities exercise control). If the estimates under ILLEGAL HUNTING are higher than 1 - 2% there may be no scope for an offtake under MANAGEMENT, and law enforcement is the only course indicated.

6. Deaths which produce legal tusks:

This total includes only those elephant whose deaths will produce legal ivory including, for the moment, those who are too young to bear tusks. It does not include recorded carcases from which the ivory has been illegally taken. All tusks from animals included in the category will be registered, stamped and recorded by the authorities. In the cases of culling, cropping, sport hunting and control hunting all deaths will (or should be) recorded and the totals in boxes **C, D, E & F** can be transferred directly to the row **DEATHS WHICH PRODUCE LEGAL TUSKS.** Two columns are not straight-forward and these are dealt with below.

a) NATURAL MORTALITY: It is necessary to multiply the number of animals dying (Box B) by a **Finding Factor** to arrive at a total in Box I. In areas which are well patrolled and most tusks recovered, or where local residents regularly hand in found ivory to the authorities this factor could be high (e.g. 0.9): in areas where there is no ground coverage by wildlife staff or where tusks are found but enter the illegal trade this factor may be zero.

b) ILLEGAL HUNTING: The only ivory which will be recovered will be from those animals which are wounded and which are not recovered by the poachers themselves. The **Finding Factor** here can only be based on past experience of the area concerned. It depends both on the amount of ground coverage and on the proportion of animals which escape from poachers in a wounded condition and die without being found by them.

In the same analysis referred to earlier for Kasungu National Park, the number of tusks recovered from animals known to have died by wounding was approximately half that recovered from natural mortality: i.e. in the case of Malawi, the factor chosen to multiply the number of animals killed illegally should be such as to give a number of tusks in Box **J** which is half that in Box **I**.

The best approach in both the above cases is probably to work backwards from a knowledge of what ivory was recovered in the previous year from carcases in the field known to have died naturally and from wounding. These are the final figures in boxes **I** and **J**. The number of animals dying naturally and from wounding must be estimated by other methods (e.g. assume a natural mortality of 1% of the population to give the total in Box **B**). The factor can then be calculated in retrospect.

Rule 6: Work backwards from totals in Boxes I & J to get finding factor.

Boxes **I,C,D,E,F,J** are summed to give **K - DEATHS WHICH PRODUCE LEGAL TUSKS.**

7. The number of animals bearing tusks:

This calculation is intended to eliminate from the quota estimate those animals which have not yet reached an age where their tusks have erupted. Allowance for tuskless adults should not be made at this stage. This is very much dependent on the category under which the animal has died, and a different factor is required for each case. The exception is SPORT HUNTING where the number can be transferred directly to the next row (Box **E**). The following deals with **Factor: no. with tusks** on the quota form.

a) NATURAL MORTALITY: The highest mortality of young elephant occurs soon after birth before they have developed permanent tusks. This would tend to suggest that a high proportion under natural mortality should not have tusks. However, this is more than compensated for by the fact that not many carcases of young elephant are found. The factor for estimating the number of animals dying naturally which bear tusks could be extracted from an ivory register which records all elephant deaths, including those of animals without tusks. In the Kasungu National Park register this is done, and the cases of natural mortality recorded without tusks is very low indeed. The same applies to data from SWRA where over a period of some 10 years no more than 4-5 carcases of juveniles were recorded. Such a situation could change in extreme drought conditions: in 1984 in Mana Pools National Park, Zimbabwe, a significant number of juvenile deaths was recorded. My recommendation here is to use a high factor - 0.9 or greater.
[Box **L** = Box **I** x Factor]

b) CULLING: In a sample of some 800 animals killed in SWRA which comprised complete herds and a balanced amount of males the proportion of animals whose tusks had not yet erupted was 0.15. Thus the factor giving the number of animals bearing tusks should be about 0.85. [Box **M** = Box **C** x Factor]

c) CROPPING: If cropping is carried out in the same manner as culling the same factor would apply. However, if only adult animals are taken then the factor becomes 1. [Box **N** = Box **D** x Factor]

d) CONTROL HUNTING: The factor here depends largely on the policy in the country concerned: if young animals are never shot on control then the factor is 1. If they are occasionally shot then the factor can be determined from office records. I would expect that very few animals too young to bear tusks are shot on control in any country, and this factor could safely be made very close to unity.

[Box O = Box F x Factor]

e) ILLEGAL HUNTING: The only reason for inclusion of a factor in this case is to cover the contingency that amongst the carcases arising from wounding which are not found by poachers may be some too young to bear tusks. An example of this would be those who lose their mothers through hunting and die shortly afterwards. The factor would be based entirely on previous records from the area concerned. It is doubtful if it would differ significantly from unity.

[Box P = Box J x Factor]

Box Q is the sum of Boxes **L,M,N,E,O,P** and gives the total number of **ANIMALS BEARING TUSKS** which will be officially recorded.

8. Total number of tusks:

A factor is introduced here to adjust for the number of animals which bear only one tusk or are tuskless. The occurrence of tuskless animals and single-tuskers varies from one region in Africa to another, and the **Factor: no. tusks/animal** should be appropriate for the area concerned. A factor derived from a culling sample in the SWRA was 1.92 for both sexes combined. However, the factor was higher for males (1.98) than for females (1.88). Rodgers et al. (1978) found a factor of 1.88 for animals in Tanzania. It is possible that in the case of SPORT HUNTING a higher factor should be used since fewer single-tuskers are taken than in any other category. However, all this may be splitting hairs: the result would probably not be affected greatly if a factor of 2 were used throughout.

This factor is applied to Boxes **L,M,N,E,O,P** & Q to calculate the new value of Boxes **R,S,T,U,V,W** & **X**, which is the **TOTAL NO. OF TUSKS.**

9. Minimum weight of tusk for export:

Certain countries have in the past placed limits on the smallest size of tusk which can be hunted, and used this limit for export. Several of the Francophone countries still use this system, and in general in countries where there is a developed internal ivory carving industry there is a tendency to use the smaller tusks for such industries, and to export the larger tusks. Pilgram and Western (1984) point out that if hunting is restricted to a certain minimum size of tusk, the security of elephant populations is assured. Because of different policies within the ivory producing countries (discussed in the next chapter) it is not possible at this stage to introduce a "blanket" minimum size of tusk in the international ivory trade. However, there is nothing to prevent individual states enforcing such a limit internally and this section is designed to cover that contingency.

At the top of Form Q1 is a box where the minimum size of tusk for export can be specified. In order to calculate the number of tusks greater than this minimum size, provision is made for a **Factor: no. tusks > limit.** This factor will vary with the source of the tusks, and probably the best method of estimating it in each case is to extract data from the ivory registers in each country. The alternative is to arrive at the value for the factor by a series of approximations over several years in the course of estimating quotas. The categories are dealt with briefly below:

a) NATURAL MORTALITY: Data from Kasungu National Park give a factor of 0.35 for the number of tusks greater than 1 kg. obtained from natural mortality. This indicates a very high recovery of small tusks: the factor is likely to be higher in most countries.

b) CULLING: A sample of 800 animals culled in the SWRA gives the following factors for the number of tusks greater than various weight limits. The data include adult males which were present in the breeding herds.

Lower limit for weight	Proportion above lower limit
1 kg	0.67
2 kg	0.47
3 kg	0.32
4 kg	0.23
5 kg	0.19
6 kg	0.13
7 kg	0.11
8 kg	0.09
9 kg	0.07
Greater than 10 kg	0.05

c) CROPPING: If carried out in the same manner as culling, the factors should be the same. If cropping is restricted to adult males and none under the official limit are killed, the factor is obviously 1.

d) SPORT HUNTING: All tusks should be greater than the legal limit and the value in Box **U** can be transferred directly to the corresponding box below.

e) CONTROL HUNTING: The Kasungu National Park data show a factor of 0.97 for the number of tusks above 1 kg. However, there is an incentive to shoot large tuskers on control in Malawi, and this figure is likely to be lower in other countries.

f) ILLEGAL HUNTING: In the Kasungu data covering animals which have died from wounding, the factor for tusks greater than 1 kg is 0.93. Note that this does not include confiscated ivory at this stage.

The total number of tusks greater than the imposed limit is summed in Box **Y (NO. TUSKS ABOVE LIMIT)** and the number of tusks under the limit, Box **Z**, is derived by subtracting Box **Y** from Box **X**. The totals in these three boxes are transferred to the appropriate boxes on Form Q2 to begin the second part of the estimate of an export quota.

ESTIMATE OF IVORY PRODUCTION AND EXPORT QUOTA

FORM Q2: ESTIMATE OF EXPORT IVORY QUOTA

COUNTRY ..... YEAR .....

Minimum export weight of tusk (if any) [ ] Kg.

	BELOW LIMIT		ABOVE LIMIT		TOTAL
TOTAL TUSKS ORIGINATING FROM AREAS WITHIN COUNTRY Carried forward from Form Q1	z	+	y	=	x
ESTIMATE OF CONFISCATED IVORY ORIGINATING WITHIN COUNTRY	a	+	b	=	c
ESTIMATE OF CONFISCATED IVORY ORIGINATING IN OTHER COUNTRIES WHICH WILL NOT BE REPATRIATED	d	+	e	=	f
IVORY HELD FROM PREVIOUS YEAR 1. GOVERNMENT STOCKS	g	+	h	=	j
2. PRIVATE DEALERS	k	+	l	=	m
3. PROVISION FOR PERSONAL EFFECTS EXPORTS BY PRIVATE CITIZENS	n	+	o	=	p
TOTAL TUSKS IN YEAR OF QUOTA	q	+	r	=	s
			−		
TOTAL TUSKS CONSUMED INTERNALLY	q	+	t	=	u
			=		
TOTAL TUSKS FOR EXPORT			v		QUOTA
			−		
LESS: NUMBER OF TROPHY TUSKS SPORT HUNTING, Box U on Form Q1 PERSONAL EFFECTS, Box p this form			w		
			=		
NET NUMBER OF TUSKS ENTERING TRADE			x		

Form Q2: Estimate Of Export Quota

1. TOTAL TUSKS ORIGINATING FROM AREAS WITHIN THE COUNTRY

The three figures from Form Q1 are entered into Boxes **X,Y & Z.** The titles **BELOW LIMIT** and **ABOVE LIMIT** refer to the **Minimum export weight of tusk** specified in the box at the top of the sheet.

2. ESTIMATE OF CONFISCATED IVORY ORIGINATING WITHIN COUNTRY

This category is the most difficult to estimate without a crystal ball. From an examination of the records of various countries it is obvious that confiscated ivory tends to occur in very large discrete amounts which are impossible to predict. The problem is that in several countries it forms the largest part of the export quota, and it makes a mockery of the system if all the carefully derived estimates from Form Q1 are dwarfed by a vast amount of confiscated ivory. Having been seized by the authorities, such ivory is obviously legal for export by governments, but obviously no government wishes to conduct its management on such a basis.

In the discussions I have had in various countries the general consensus is that it is neither practical nor desirable to include a large provision for confiscated ivory in the quota estimate. The best solution is an administrative one, where confiscated ivory is kept separate from the remainder of the quota and in the event of a large amount being seized, a provision will be made under the rules of the quota system for the country concerned to advise the CITES Secretariat after the seizure that the amount is to be added to the export quota during the quota year.

Nevertheless, hardly any country goes through a year without some minimum amount of confiscated ivory, and it is this which should be entered in the appropriate boxes in this section. The estimate can be very simply based on the minimum or typical figure from the preceding years.

The proportions greater or less than the export limit can be estimated from an analysis of the ivory register in the country concerned. For example, in the ivory store at the headquarters in Malawi, 77% of the confiscated tusks were greater than 1 kg. and 23% were less.

These totals should be entered in Boxes, **a,b, & c.**

3. CONFISCATED IVORY ORIGINATING FROM OTHER COUNTRIES

The same arguments apply as in the last section. Policies towards repatriating ivory originating from neighbouring countries vary from one country to another in Africa: a new initiative is afoot among the Central African states to co-operate in preventing exports of one country's ivory by another, while in Southern Africa repatriation is unlikely. There have been proposals for forming a fund from such confiscated ivory to assist conservation efforts in Africa. This subject is discussed further under administrative measures. As a matter of policy, it seems unwise to include a large allocation under this heading in Boxes **d,e & f.**

4. IVORY STOCKS FROM THE PREVIOUS YEAR

1. Stocks held by Government:

The provision here is to cover any tusks remaining from the previous quota year. The proportions above and below the export limit can be assessed accurately because the tusks are in government hands. This information is entered in Boxes **g,h** & **j**.

2. Stocks held by private dealers:

It is very important that these are entered into the quota estimate: any significant amount of ivory in this category has the potential to cause major problems if it is not taken into account at the outset. This should apply only to dealers within the country of origin (discussed further in the next chapter). As in the previous case, the values for Boxes **k,l** & **m** can be precisely estimated.

3. Provision for export of personal effects by private citizens:

This is a small category covering the specific case of a resident of the country who owns trophy tusks not acquired in the year of the quota, and who decides to leave the country, exporting his trophies as personal effects. He will require an export permit for the tusks, and a provision can be made under this heading in Boxes **n,o** & **p**. Such tusks are extremely unlikely to be smaller than the export minimum, or to enter the trade.

5. TOTAL TUSKS AVAILABLE IN YEAR OF QUOTA

The figures for Boxes **q**, **r** & **s** are the totals of all boxes above.

6. TOTAL TUSKS CONSUMED INTERNALLY

Provision is made here for the number of tusks which will be used in the domestic carving industry of the country. The total is made up of all tusks smaller than the export minimum **(Box q)** and a certain number of tusks above the export minimum **(Box t)**. The total of the two is the amount consumed internally **(Box u)**.

7. TOTAL TUSKS FOR EXPORT

The amount in **Box v** is derived by subtracting the figure in **Box t** from the total number of tusks greater than the export minimum **(Box r)**. This figure is the final **EXPORT QUOTA**.

8. NUMBER OF TUSKS ENTERING THE INTERNATIONAL TRADE

The number of tusks entering the trade **(Box x)** is obtained by subtracting the number of trophy tusks (Sport hunting - **Box U** on Form Q1 and **Box o** on Form Q2) from the total export quota **(Box v)**.

A worked example of Forms Q1 and Q2 for Zimbabwe is given in Appendix 12.

KEY FACTORS INVOLVED IN SETTING QUOTAS

In this section I will discuss implications arising from setting quotas which will affect all countries, and the following section will address those aspects of quotas which are peculiar to individual countries.

1. It may well be that the method outlined is somewhat daunting. Whatever methodology is followed by individual countries, provided it addresses the following important questions it should suffice:

   a) How many elephant will die in the country during the quota year?

   b) How many tusks will they produce?

   c) How many tusks will arise from other sources?

   d) How many of these tusks will enter the international trade?

   This may appear self-evident, but unless the problem is approached in this manner, the quota estimates are likely to be of little value.

2. It is necessary for wildlife agencies in each country to consider the total elephant population in the country, not simply that part of the resource located within protected areas.

3. It is necessary for the same authorities to take into account the total stock of ivory in the country, and not just the tusks which will pass through government hands. The number of tusks held by private dealers and the carving industries must be recorded. Whilst the quota system for international trade can do nothing to affect domestic carving industries in countries, the responsible wildlife agencies themselves should take into account both internal and export ivory. **An export quota which appears to be well below the minimum which the elephant population can sustain will be meaningless if the internal carving industry is using a large amount of ivory which the populations cannot sustain.**

4. A vital part of estimating the quota is to understand the various components which make up the final total. How many of the elephants dying are the result of positive management by the authorities, and how many deaths are caused by factors beyond their control? Clearly the objective must be to bring more and more of the elephant deaths under the heading of management and reduce the illegal component.

5. By following a process of quota setting such as that outlined, it rapidly becomes apparent which ivory is bypassing the authorities without being recorded. This need not necessarily be the tusks arising from illegal hunting: within many of the administrative systems I encountered it became obvious that a large part of the ivory trade begins and ends in private hands without the authorities controlling or monitoring the process at any stage - **and no laws are being broken.**

6. It is essential to regard the inception of the quota system as a move towards active, adaptive management. In the early stages, it must be fully accepted that few countries have the information to estimate their ivory production accurately. However, it is vital that the authorities concerned are bold enough to make informed guesses at each stage of the estimating procedure, and accept that these can be improved in the following year. At the same time, in order to make the improvement, **a system of data recording must be put in place** designed to answer those questions which arose at the first attempt to set a quota.

7. The question of quota justification was discussed in each of the countries visited. Would it be adequate to simply advise the CITES Secretariat of a number, or should the quota be backed up by a statement of how it was calculated? Most countries were in favour of some sort of standardised procedure for setting quotas, and after running through the method outlined felt that they would not be averse to presenting their estimates on such a form. All countries were particularly mindful of the fact that, like it or not, their quotas were bound to come under some form of scrutiny and it might be better to pre-empt questions by a fuller explanation at the outset. A quota which is simply based on a past record of exports would be far less acceptable than one justified on grounds of management.

8. One advantage in presenting in full the various calculations leading to the final export quota is that it will clearly demonstrate to non-producer countries the chief sources of ivory. Many critics of African countries feel that the exports of raw ivory are largely a result of the number of hunting permits issued. This is simplistic and ignores the numerous sources of ivory. Indeed, in all countries visited the smallest part of ivory exports comes from sport hunting and such tusks do not enter the international trade. Yet there still seem to be lobbies that are pressing for hunting bans as the solution to elephant preservation - bans which, if implemented, will do nothing to reduce the illegal trade and might even increase it.

9. At the start of this chapter, I quoted a passage from the CITES Secretariat which stated that "for the quota system to be successful, quotas must be realistic". In each country I have advised against setting a low quota which is unrealistic in terms of the recent history of ivory exports. At the same time there is little doubt that in many countries elephants are being exploited at a rate which far exceeds anything that the population can sustain. To simply take this as a guide to the size of quota is shying away from the conservation responsibilities.

   I believe that the only sensible approach is to follow a method such as the one outlined in this chapter, and in all cases of doubt regarding the correct values to use at each stage of the calculation to adopt a higher value rather than a lower one. It will serve no purpose to underestimate the number of animals which will die in the year concerned, and it is financially irresponsible to cause a situation where, because of a technical error, ivory may be held in storage to avoid exceeding a stated quota. However, the final export quota calculated by this method should be carefully compared with the recent record of exports and if there are vast discrepancies, or if the result is not that desired by the authorities on policy grounds, then the procedure should be repeated until a compromise situation is reached. At least by identifying all the parts of the quota, there is the opportunity to decide where adjustments can be made. If the result leads authorities to conclude that their elephant populations were unnecessarily overexploited in the past then I can see no reason to simply continue at the same level of exploitation.

EXPORT QUOTAS FOR INDIVIDUAL COUNTRIES

I have been asked by the CITES Secretariat to make some estimate of the total export quota for Africa, and to do this it is necessary to consider the expected quotas which individual countries will contribute.

I find myself in an invidious position here. In each country I stressed that it was not my task to set the export quota, and my role was to provide assistance should it be required. In the "dummy" quota-setting exercises the approach was mainly to demonstrate the technique, rather than to finalise an export quota. Now it appears I am about to be dishonourable.

Therefore, I will not reproduce the results of the quota-setting exercises in each country, but will make my own estimates of quotas. The official authorities should not feel that my estimates are intended to put pressure on them, and should only regard my figures as a broad guide. In many cases I may not have taken into account the policies of the governments concerned, or the political realities of the situation.

In the time available it is not possible to go through the process demanded by Forms Q1 & Q2 for all countries. The estimates have been made very rapidly, and attempt only to extract the major features of the quota which might be expected in each country. The approach I have used is as follows:

a) In the long term, where elephant are being managed for ivory production, the maximum sustained harvest will be achieved by a low offtake of large males, coupled with a culling programme of breeding herds if populations cannot be allowed to increase until they reach stability. However, to suddenly suggest that all of Africa should stop hunting elephant overnight is unlikely to find acceptance, and will probably accelerate the illegal trade. A sounder strategy at this stage would be to try to limit offtakes to no more than about 2% of populations, which should allow numbers to increase, and then gradually to reduce the offtake of males over a period of years. This is provided the range is available for populations of elephant to increase if it is not, the correct culling strategies will still produce a high yield. I stress that, contrary to intuitive feelings, **the greatest long term yield of ivory will be provided by a low harvest of adult males.**

b) Bearing in mind the requirements of the consumer countries, I have deliberately selected for the highest quota possible compatible with the strategy expressed in a) above. To immediately move to the optimum strategy of minimum harvest would lead to a slump in ivory production for several years while elephant populations recovered and large tusks began to appear in the populations. I have tried to steer a course which allows some production while populations are recovering.

c) I have separated the quota into a sustained yield, and a surplus which may appear in the first year of the quota system due to stored amounts of ivory or culling operations, but cannot be expected to be part of the quota in following years. These surpluses are present at the time of writing in February 1985, but may have entered the international trade before the introduction of the quota system in 1986.

d) As far as possible I have tried to take into account the policies in each country towards wildlife utilisation. I may have suggested some offtakes which are incompatible with conservation policies in certain countries, and if this is so, the final export quota will be lower.

e) I have not included sport hunting in the quota calculations because these tusks do not enter the international trade. Provided the quota for sport hunting in each country does not exceed about 0.5% of the population estimate, this can be accommodated over and above the trade quota without throwing populations into a decline.

f) Where I have had to make estimates of a weight of ivory for which I have no data on mean tusk weight I have used the figure of 5.9 kg (rounded to 6 kg) from Caldwell (1984) for tusks entering the trade in Hong Kong and Japan in 1983. For culling operations I have assumed that 85% of animals carry tusks and the mean tusk weight is 3 kg based on Zimbabwean data. For ease of computation, I have assumed that all elephant have two tusks. All weights given are in kilogrammes.

g) I have excluded illegal hunting from the quota, because I have no way of estimating the extent of it. Parker and Bradley Martin (1982) state that most tusks which may have illegal origins nevertheless leave Africa with legal documents. If this is so then they would use a part of the quota in the exporting country and the remainder of the quota which is determined by management policies would have to be reduced accordingly.

h) I have not justified the small numbers of tusks I have allocated in some countries to end of year surpluses, confiscated amounts, or findings from natural mortality. Parker (1979) estimated the proportion of found ivory in the Hong Kong trade to be about 20%, but I have assumed lower amounts in these estimates, because I believe in recent years that natural mortality will have declined due to intensive hunting. The proportion in the ivory registers in Malawi and Tanzania was about 1%.

i) It is extremely difficult to set quotas for countries whose declared policy of elephant exploitation is a total ban on all hunting or a limited number of trophies for safari hunting, yet whose exports often amount to hundreds of tonnes. In cases such as this I have allowed a cropping quota in keeping with the principle discussed in b) above. However, such a cropping quota is not part of the official policy.

j) It is difficult to take into account the war situations which obtain in certain countries. In such cases I have simply estimated a quota which should come into effect when order is restored.

The sequence which follows is in the order of countries in Table 1 and uses the final population estimates from the same table.

WEST AFRICA

Population: 16 900

West Africa can contribute little to the international trade. At an offtake of 2% it would produce some 700 tusks, all of which would be consumed internally.

Sustainable quota: 700 tusks weighing 4.2 tonnes.
Surplus 1986 only: zero
Internal industry: 700 tusks weighing 4.2 tonnes.
Export quota 1986: zero

CENTRAL AFRICA

Central African Republic

Population: 19 500

At an offtake of 2.1% the production would be 800 tusks per annum weighing 4.8 tonnes. Froment (1985) estimates that the internal carving industry requires 15-30 tonnes each year. Clearly the sustainable production cannot support this even if the full amount is diverted to the internal industry. There is no surplus for an export quota.

Sustainable quota: 800 tusks weighing 4.8 tonnes.
Surplus 1986 only: zero
Internal industry: 800 tusks weighing 4.8 tonnes.
Export quota 1986: zero

Cameroon

Population: 12 400

Virtually all of Cameroon's ivory production is used internally, and the country has not exported since 1981 (Caldwell, 1984). However, the authorities wish to have a small export quota to provide for the contingency of a surplus, and to retain an element of competition between the carving industry and international buyers. At present the artisans use a high proportion of illegal ivory in their work, and the authorities are introducing measures to reduce this. Elephant populations in the country may be stable or even increasing slightly.

A 2% offtake would produce some 500 tusks. The average weight of confiscated ivory in the Yaounde store is about 12 kg. and using this figure the annual production would be 6 tonnes. Allowing 400 tusks for internal use this gives 100 tusks weighing 1.2 tonnes for export each year.

The authorities have some 400 tusks (4.8 tonnes) on hand at present. I have assumed that all of this will be exported in 1986.

Sustainable quota: 500 tusks weighing 6 tonnes.
Surplus 1986 only: 400 tusks weighing 4.8 tonnes.
Internal industry: 400 tusks weighing 4.8 tonnes.
Export quota 1986: 500 tusks weighing 6 tonnes.

Chad — Population: 2500

This elephant population has been subjected to intense hunting and has few animals with large tusks. The authorities see the primary need as one of restoring the population to former levels following the events of the war. The maximum yield for several years should not exceed 2% - preferably less. This gives only 100 tusks which would be totally absorbed by the internal carving industry.

The authorities believe there are large illegal ivory caches still within the country following the war, and are considering special moves to recover this ivory. Assuming their project is successful, they anticipate a minimum of 25 tonnes will be recovered and exported.

Sustainable quota: 100 tusks weighing 0.6 tonnes.
Surplus 1986 only: 4000 tusks weighing 25 tonnes.
Internal industry: 100 tusks weighing 0.6 tonnes.
Export quota 1986: 4000 tusks weighing 25 tonnes.

Congo — Population: 59 000

The Congo exported the following amounts to Hong Kong in recent years:

	1979	1980	1981	1982	1983
Total weight:	52 754	68 493	117 882	61 009	814 kg.
Mean tusk weight:	9.8	6.7	6.8	5.8	5.9 kg.
Number of animals:	2 692	5 111	8 667	5 259	69

(From Caldwell (1984). I have used the mean tusk weights from Hong Kong and Japan combined, which may be slightly high.)

The authorities were amazed at these figures, since their own records show a fraction of the total. There is a high possibility that false certificates of origin were used to cover Zairian exports.

I have evaluated a possible quota below. It includes a 1% cropping quota which is based on the "legalised poaching" proposal discussed in the final chapter of this report.

	Animals	Tusks	Av.Wt.	Total Wt.
Natural Mortality:	50	100	6	600
Cropping:	600	1200	10	12000
Confiscations:	100	200	6	1200
Surplus:	250	500	6	3000
TOTALS	1000	2000		16800

Assume 800 tusks used internally at 6 kg - 4.8 tonnes.
Assume 1200 tusks exported at 10 kg - 12.0 tonnes.

Sustainable quota: 2000 tusks weighing 12 tonnes.
Surplus 1986 only: zero
Internal industry: 800 tusks weighing 4.8 tonnes.
Export quota 1986: 1200 tusks weighing 12 tonnes.

Note: The quota constitutes 1.6% of the estimated population per annum. If the actual population is as low as 20 000 animals the percentage offtake rises to 5%, which should still be sustainable.

Equatorial Guinea — Population: 1 800

The production on a sustained basis would be less than 100 tusks giving under a tonne per year. All of this would be consumed internally and the amount has not been included here.

Gabon — Population: 48 000

Like the Congo, Gabon is a difficult country for which to estimate a quota. Gabon's past history of ivory exports is negligible largely because of a large market in Libreville for worked ivory. If some 35 000 French residents are estimated to purchase 0.3 kg of worked ivory each, this amounts to 10 tonnes consumed within the country per year. Residents of Gabon advised me that the figure was likely to be higher. A significant amount of both raw and worked ivory enters the country illegally from neighbouring countries.

An offtake of 1000 animals (2.1%) gives an output of 2000 tusks. If it is assumed that 1800 of these weighing 6 kg are used in the internal industry, and the balance of 200 at 10 kg are exported this gives a quota of 2 tonnes. As in the case of Congo, if the population is half that estimated the quota is still sustainable.

Sustainable quota: 2000 tusks weighing 12.8 tonnes.
Surplus 1986 only: zero
Internal industry: 1800 tusks weighing 10.8 tonnes.
Export quota 1986: 200 tusks weighing 2.0 tonnes.

Zaire — Population: 523 000

Zaire has a hunting ban in effect at present, but this has not prevented a large amount of illegal hunting. In 1983, Zaire exported 40 tonnes to Hong Kong, and there may be large amounts of ivory moving into neighbouring countries. This makes it difficult to calculate a legal quota. Recognising the de facto situation, a system of "legalised poaching" to replace illegal hunting was discussed with the authorities in Zaire, and I have included a 0.5% cropping quota to provide for this in the calculations below.

	Animals	Tusks	Av.Wt.	Total Wt.
Natural Mortality:	500	1 000	6	6 000
Cropping:	2 500	5 000	10	50 000
Confiscations:	500	1 000	6	6 000
Surplus:	500	1 000	6	6 000
TOTALS	4 000	8 000		68 000

Assume 3 000 tusks used internally at 6 kg - 18 tonnes.
Assume 5 000 tusks exported at 10 kg - 50 tonnes.

Sustainable quota: 8 000 tusks weighing 68 tonnes.
Surplus 1986 only: zero
Internal industry: 3 000 tusks weighing 18 tonnes.
Export quota 1986: 5 000 tusks weighing 50 tonnes.

Note: This quota is 0.8% of the population: if the number of animals is as low as 100 000 the proportion only rises to 4%, which should be sustainable.

EAST AFRICA

Ethiopia

Population: 9 000

The chief source of legal ivory is through confiscation. No culling or cropping is carried out, and control work is very low. The authorities are not particularly anxious to promote elephant utilisation for the ivory trade and licences issued for sport hunting seldom exceed 10 per year. At present there is a surplus of some 500 tusks in Addis Ababa which I have assumed will be exported. The quota might be made up as follows.

	Animals	Tusks	Av.Wt.	Total Wt.
Natural Mortality:	15	30	6	180
Control:	10	20	10	200
Confiscations:	75	150	10	1500
TOTALS	100	200		1880
Surplus (1986 only):	A	300	10	3000
(2 main grades are present in the	B	200	6	1200
ivory store)		500		4200

Assume 100 tusks used internally at 9 kg - 0.9 tonnes.
Assume 100 tusks exported at 10 kg - 1.0 tonnes.

Sustainable quota: 200 tusks weighing 1.9 tonnes.
Surplus 1986 only: 500 tusks weighing 4.2 tonnes.
Internal industry: 100 tusks weighing 0.9 tonnes.
Export quota 1986: 600 tusks weighing 5.2 tonnes.

Kenya

Population: 28 000

Kenya is unique in having no internal carving industry and no private dealers. All ivory has to be exported. Ivory arises only from control hunting, natural mortality and confiscation. Kenya's prime use for elephant is in the tourist industry, and thus there is little point in calculating a percentage offtake based on the entire population.

	Animals	Tusks	Av.Wt.	Total Wt.
Natural Mortality:	50	100	6	600
Control:	150	300	6	1800
Confiscations:	200	400	6	2400
Surplus:	100	200	6	1200
TOTALS	500	1000		6000

Sustainable quota: 1000 tusks weighing 6.0 tonnes.
Surplus 1986 only: zero
Internal industry: zero
Export quota 1986: 1000 tusks weighing 6.0 tonnes.

This is 1.7% of the population.

Somalia — Population: 9 000

A hunting ban has been in effect since 1971 and all private carving industries and dealings in raw ivory are prohibited. The Government is starting a small carving industry. The largest part of the Somalia quota is a stock of 40 tonnes held by the Government at present which the authorities intend clearing in the near future. Future acquisitions of ivory will be used internally and a sustained yield of 1.1% would give 200 tusks for this purpose.

Sustainable quota: 200 tusks weighing 1.2 tonnes.
Surplus 1986 only: 12276 tusks weighing 40 tonnes.
Internal industry: 200 tusks weighing 1.2 tonnes.
Export quota 1986: 12276 tusks weighing 40 tonnes.

Sudan — Population: 32 300

All raw ivory exports were banned in December 1983, although a few private dealers are fulfilling contracts extending beyond the date of the ban. The authorities intend to have a fairly large quota in the first year of the system to clear present stocks, and envisage a low quota thereafter to handle ivory as it accumulates to Government.

	Animals	Tusks	Av.Wt.	Total Wt.
Natural Mortality:	25	50	6	300
Control:	150	300	10	3000
Confiscations:	125	250	6	1500
TOTALS	300	600		4800
Surplus (1986 only):		5 000	6	30 000

Assume 300 tusks used internally at 6 kg - 1.8 tonnes.
Assume 300 tusks exported at 10 kg - 3.0 tonnes.

Sustainable quota: 600 tusks weighing 4.8 tonnes.
Surplus 1986 only: 5 000 tusks weighing 30 tonnes.
Internal industry: 300 tusks weighing 1.8 tonnes.
Export quota 1986: 5 300 tusks weighing 33 tonnes.

The Sudan population could probably stand a higher offtake, but in this case I am anticipating the wishes of the authorities who are anxious to restore the status of the population which has been heavily hunted in recent years, and consists mainly of young animals. Caldwell (1984) states that some 90% of exports had a mean tusk weight of 3.9 kg.

Tanzania — Population: 216 000

The level of exploitation appears to be fairly low relative to the rest of Africa, although the quantity involved in the illegal trade is not known. Tanzania's total annual exports have been of the order of 10 tonnes in recent years. A feature of the Tanzanian quota is the large proportion of animals shot on control - in this respect it differs from all other countries. Confiscations and recovery of tusks from natural mortality by Government are relatively low.

I have put together a "maximum" quota which increases exploitation in a number of areas. I have reduced the number of animals shot on control and replaced this with a quota of animals cropped for economic reasons (legalised poaching) in the areas outside National Parks. The mean tusk weight for such cropped animals is assumed to be 15 kg because of the relatively high conservation status in the country. I have also included a culling quota for Ruaha National Park, following Barnes (1983). Barnes recommended a far higher number than is shown below, but later felt that illegal hunting might perform the necessary reduction. I have taken the approach that a lower number taken officially in several successive years might be a better solution. The amount consumed by the carving industries inside the country is based on a figure of some 7.5 tonnes for Dar es Salaam (Ivory Room data) and an equivalent amount for the remainder of the country. There are no private ivory dealers: all tusks for the internal industry come from Government sales.

	Animals	Tusks	Av.Wt.	Total Wt.
Natural Mortality:	200	400	5	2 000
Cropping:	1 000	2 000	15	30 000
Controls:	500	1 000	10	10 000
Confiscations:	300	600	5	3 000
Surplus:	250	500	10	5 000
TOTALS	2 250	4 500		50 000
Surplus(1986-88 only): (Culling operations)	3 000	5 000	3	15 000

Assume 2 000 tusks used internally at 7.5 kg - 15 tonnes.
Assume 2 500 tusks exported at 14 kg - 35 tonnes

Sustainable quota: 4 500 tusks weighing 50 tonnes.
Surplus 1986 only: 5 000 tusks weighing 15 tonnes.
Internal industry: 2 000 tusks weighing 15 tonnes.
Export quota 1986: 7 500 tusks weighing 50 tonnes.

Excluding culling operations the quota is some 1% of the population, to which can be added a small percentage for sport hunting.

Uganda — Population: 2 000

A 2.5% yield will give 100 tusks which I assume would be consumed internally.

SOUTHERN AFRICA

Angola — Population: 12 400

The current situation in Angola is uncertain. It is perhaps best to make an allowance of about 2% to take effect when events return to normal. This gives 250 animals (500 tusks). Assuming 100 tusks are retained in the country (6 kg mean tusk weight), this gives an export quota of some 400 tusks (4 tonnes at 10 kg).

Sustainable quota: 500 tusks weighing 4.6 tonnes.
Surplus 1986: zero
Internal industry: 100 tusks weighing 0.6 tonnes.
Export quota 1986: 400 tusks weighing 4.0 tonnes.

Botswana — Population: 45 300

Elephant populations are increasing in Botswana. Hunting was banned two years ago, and the chief source of ivory is from confiscations. As for Tanzania, I have estimated a "maximum" quota, which includes the possibility of culling in Chobe National Park, and a cropping quota to satisfy rural needs. Whilst Government is not holding any significant surplus of ivory at the moment, the possibility exists of stocks in private hands which have not been taken into account below.

	Animals	Tusks	Av.Wt.	Total Wt.
Natural Mortality:	50	100	10	1 000
Cropping:	250	500	10	5 000
Control:	50	100	10	1 000
Confiscations:	150	300	10	3 000
TOTALS	500	1 000		10 000
Surplus(1986-87 only): (Culling operations)	2 000	3 400	3	10 200

Assume 200 tusks used internally at 10 kg - 2 tonnes.
Assume 800 tusks exported at 10 kg - 8 tonnes.

Sustainable quota: 1 000 tusks weighing 10 tonnes.
Surplus 1986 only: 3 400 tusks weighing 10.2 tonnes.
Internal industry: 200 tusks weighing 2 tonnes.
Export quota 1986: 4 400 tusks weighing 18.2 tonnes.

Excluding culling operations the quota is some 1.1% of the population.

Malawi — Population: 2 400

Malawi consumes most of its production in its own carving industry. The country might require a quota for occasional large amounts of confiscated ivory, but it would prefer to advise this as and when necessary. A 2% offtake would give 100 tusks.

Sustainable quota: 100 tusks weighing 1 tonne.
Surplus 1986 only: zero
Internal industry: 100 tusks weighing 1 tonne.
Export quota 1986: zero

Mozambique — Population 27 400

As in Angola, it is difficult to plan for Mozambique in the current security situation. I have assumed a quota of 500 tusks (1.8%), all of which would be exported.

Sustainable quota: 500 tusks weighing 5 tonnes.
Surplus 1986 only: zero
Internal industry: zero
Export quota 1986: 500 tusks weighing 5 tonnes.

Namibia — Population: 2 000

A quota of 2.5% has been estimated. Tusks from Namibia have a lower weight than average.

Sustainable quota: 100 tusks weighing 0.5 tonnes.
Surplus 1986 only: zero
Internal industry: zero
Export quota 1986: 100 tusks weighing 0.5 tonnes.

South Africa — Population: 8 000

The population in Kruger National Park is kept more or less constant at 8 000 animals, entailing an annual offtake of about 3%. Occasional large tusks accrue from natural mortality. A significant amount of the ivory is used in the carving industries inside the country. I have allowed for some 10 tonnes of ivory stocks which may be held by private dealers.

	Animals	Tusks	Av.Wt.	Total Wt.
Natural Mortality:	25	50	20	1 000
Control:	25	50	6	300
Culling:	250	400	3	1 200
TOTALS	300	500		2 500

Assume 450 tusks used internally at 3.3 kg - 1.5 tonnes.
Assume 50 tusks exported at 20 kg - 1.0 tonnes.

Stocks held by private dealers: 1 000 tusks at 10 kg - 10 tonnes.

Sustainable quota: 500 tusks weighing 2.5 tonnes.
Surplus 1986 only: 1000 tusks weighing 10 tonnes.
Internal industry: 450 tusks weighing 1.5 tonnes.
Export quota 1986: 1050 tusks weighing 11 tonnes.

Zambia — Population: 58 000

If the population data are correct in 1981 and 1985, Zambia has lost 100 000 elephant in the space of 4 years. This seems unlikely. The Hong Kong trade figures for 1983 show that Zambia exported only 10 tonnes, and Zambia's own statistics for the same year show 10 tonnes exported to the U.K. which may have been re-exported to Hong Kong. Stocks on hand in the Government store at the end of 1982 were 10 tonnes, so that this is consistent. One can only conclude that there are either more elephant in Zambia than 58 000 or that earlier population estimates were too high or that massive illegal hunting involving some 30 000 elephant per year has escaped detection. The last possibility is the least credible: firstly, the numbers are beyond the capability of highly professional culling teams, and secondly it would be almost impossible to conceal a slaughter of such magnitude. I would opt for an explanation that the population is slightly higher than estimated, and perhaps earlier estimates were too high.

Nevertheless, all is not well with Zambia's elephant population. The largest part of Zambian exports comes from confiscated ivory, and if the record held in the ivory store can be taken as a representative sample, then it appears that Zambia's ivory harvest has changed recently from a few large tusks to many small tusks. This situation suggests the scenario depicted by Pilgram and Western (1984) of a constant (or increasing) annual harvest with selective elimination of the larger animals.

	1980			1984		
	No.	Wt.	Av.Wt.	No.	Wt.	Av.Wt.
Grade I (tusks over 10 kg)	215	5412	25.2	99	1134	11.5
Grade II (6-10 kg)	181	1710	9.4	298	1992	6.7
Grade III (less than 6 kg)	90	343	3.8	2996	7388	2.5

In 1980 the bulk of the stock was made up of 215 tusks averaging 25 kg. In 1984 this had changed to 2996 tusks averaging 2.5 kg. Within each grade the mean tusk weight has changed. Grade I tusks are now fewer and hardly exceed 10 kg; Grade II tusks which used to lie close to the upper limit of 10 kg average 6.7 kg, and Grade III tusks are now 2.5 kg versus 3.8 kg four years previously.

Zambia introduced a hunting ban in 1982 and revoked all carving industries and dealers' licences in 1984. Accepting the current population estimate, the following is a maximum quota estimate. The cropping quota is based on a 1% harvest of populations outside the National Parks (14 000 animals), control hunting is low (the cropping quota should include most control hunting), and confiscations are reduced (legalised cropping should reduce illegal hunting). The average weight of confiscations is based on the 1984 data above.

	Animals	Tusks	Av.Wt.	Total Wt.
Natural Mortality:	10	20	5	100
Cropping:	190	380	10	3 800
Control:	50	100	10	1 000
Confiscations:	1 250	2 500	3	7 500
TOTALS	1 500	3 000		12 400
Surplus (1986 only): (present stocks)		3 400	3	10 400

Assume 1 000 tusks used internally at 2.4 kg - 2.4 tonnes.
Assume 2 000 tusks exported at 5 kg - 10.0 tonnes.

Sustainable quota: 3 000 tusks weighing 12.4 tonnes.
Surplus 1986 only: 3 400 tusks weighing 10.4 tonnes.
Internal industry: 1 000 tusks weighing 2.4 tonnes.
Export quota 1986: 5 400 tusks weighing 20.4 tonnes.

The quota is some 2.5% of the population caused largely by the amount of confiscations. A lower quota would be preferable, but this can only be achieved by reducing illegal hunting.

Zimbabwe Population: 49 000

Zimbabwe decided in 1983 to reduce its elephant population over a number of years to some 33 000 for conservation reasons. Some 6 000 elephant were removed in 1984, and 7 000 are scheduled to be removed in 1985. The following quota is based on a sustained yield from the final population (33 000), which includes provision for culling an annual population increment of about 3% and a large temporary surplus due to the major population reduction.

	Animals	Tusks	Av.Wt.	Total Wt.
Control:	100	200	10	2 000
Confiscations:	100	200	10	2 000
Culling:	1 000	1 700	3	5 100
TOTALS	1 200	2 100		9 100
Surplus(1986-87 only): (major culling)	7 000	11 900	3	35 800

All tusks from the final sustained yield will be used internally.

Sustainable quota: 2 100 tusks weighing 4.3 tonnes.
Surplus 1986 only: 11 900 tusks weighing 35.8 tonnes.
Internal industry: 2 100 tusks weighing 4.3 tonnes.
Export quota 1986: 11 900 tusks weighing 35.8 tonnes.

The quota is some 3.6% of a final population of 33 000 animals, which should ensure no further increase.

A QUOTA FOR AFRICA

Quota derived from individual countries

The totals which follow from the preceding section are as follows:

A long term harvest based on a strategy which uses 1-3% of the population in the various producing countries, and which will allow populations to increase slowly, is 227.8 tonnes arising from 29 000 tusks from 14 700 animals. This amounts to 1.2% of Africa's elephant population of 1 183 900 animals.

Of the above amount, 84.1 tonnes (14 250 tusks) is required for internal consumption in Africa's carving industries.

The balance of 143.7 tonnes (14 750 tusks) is available for export.

In addition to the above, there should be a further 185.4 tonnes (45 576 tusks) which can be added to the export quota in the first quota year. This arises from present stocks of ivory being held on the continent and proposed culling operations which will not be sustained.

Rounding the above figures:

	TOTAL SUSTAINABLE PRODUCTION	29 000 TUSKS	(228 TONNES)
deduct	CONSUMPTION WITHIN AFRICA	14 000 TUSKS	(84 TONNES)
	NET SUSTAINABLE EXPORT QUOTA	15 000 TUSKS	(144 TONNES)
add	TEMPORARY SURPLUS (1986)	46 000 TUSKS	(185 TONNES)
	EXPORT QUOTA (1986)	61 000 TUSKS	(329 TONNES)

Quota derived directly from the total population estimate

Assuming a round figure of one million elephants in Africa, the outcomes of different harvesting levels can be calculated. I have used a mean tusk weight of 6 kg (Caldwell, 1984: from the combined imports to Japan and Hong Kong in 1983).

1% harvest gives 10 000 animals or 20 000 tusks weighing about 180 tonnes.
2% harvest gives 20 000 animals or 40 000 tusks weighing about 240 tonnes.
3% harvest gives 30 000 animals or 60 000 tusks weighing about 360 tonnes.

From the earlier arguments in this chapter it should be apparent that to exceed a 3% harvest under the present methods of selective hunting from elephant populations in Africa will lead to a **lower** harvest in the long term. A harvest of 5% under selective hunting might be sustained, but would be highly undesirable. It would lead to further reductions in the mean tusk weight and bring populations to a vulnerable point where the slightest increase would precipitate a major downward trend. Furthermore, not all of Africa's elephant populations are available for this form of exploitation: many are in National Parks where the declared policies do not allow harvesting.

The decline in mean tusk weight in the ivory trade is a clear indication that a directional process is taking place. Parker and Bradley Martin (1983) examined the implications of this decline for the years 1979-82, and concluded that it was greatly influenced by events in the Sudan. Their figures for the mean tusk weight are slightly higher than those computed by Caldwell (1984) who shows a further low mean tusk weight of 5.9 kg in 1983. However, this syndrome can no longer be attributed to Sudan only: many other countries are suffering a similar decline [e.g. Zambia (see previous section), and C.A.R. (Froment, 1985)]. This suggests that the upper age classes in elephant populations are being exploited beyond a sustainable level (Pilgram et al., 1984a).

Strategies to improve the situation

At the conclusion of the models which I discussed earlier in this chapter, I mentioned that the set of parameters which fitted all aspects of the 1983 situation in the ivory trade was as follows. The current population should be about 800 000 animals declining at a rate of 1.8%, of which 70 000 animals are being harvested to produce some 750 tonnes of ivory at a mean tusk weight of 6 kg. At the current rate of exploitation the population will crash very quickly (10 years). [SEE FOOTNOTE]

The next logical question for modelling is "to what level must the harvest be reduced in order to reverse the decline?". I have tested this out by switching to a new level of harvesting at the point in the model when it has reached the 1983 conditions. I find that it can just sustain a harvest of 380 tonnes but takes some 50 years to recover or stabilise at the new rate. At lower harvest levels, if we take the time to recover to one million animals as a yardstick, a yield of 350 tonnes will allow recovery in 25 years, 300 tonnes in 10 years, 250 tonnes in 7 years, and 200 tonnes in 5 years. In the last case the rate of growth of the population when it passes the one million mark is over 4%. At this stage culling strategies might be considered. The necessary level to which the offtake must be reduced in the case of the 300 tonne harvest is 26 000 animals, and in the case of the 200 tonne harvest it is 18 000 animals - which is more or less 1.5 - 2.5% of the population.

Now, the foregoing is all very well but it assumes that Africa's elephant populations constitute one large herd which is being subjected to the same harvesting conditions throughout. This is not so. Populations vary from the well conserved to those in dire trouble. The master plans for protected areas in many countries do not provide for a high offtake of ivory to satisfy the trade. What we are watching in modelling the ivory trade statistics is nothing resembling the true process in Africa. If some populations are well conserved it means that others must be contributing more than their share to the harvest. This indeed seems to be the case. The 750 tonnes per annum of raw ivory is coming from a series of effective extinctions of elephant populations in different countries in Africa. It appears as if Sudan, Chad, Central African Republic and the Congo who have recently exported massive amounts of ivory are going through this process.

If the above is true then it is not sensible to look at Africa as a whole in setting a global ivory quota as I have done at the start of this section: the only logical course to follow is that of considering the individual countries. Some have populations in healthy states and can contribute a large amount to the ivory trade: others need a total moratorium on all hunting. When all countries are lumped together the overall mean figures suggest that an offtake not exceeding 3% of the total population is as far as harvests should be taken.

The situation would be greatly improved with positive management strategies. I have shown that at the level of one million animals it is not difficult to produce 750 tonnes of ivory on a sustained basis, but it does mean adopting scientific strategies of culling as opposed to the present uncontrolled harvest. Pilgram and Western's (1984) findings that the natural mortality of a stable population is a maximum harvest may also be applicable in protected areas.

NOTE: Since this report was completed in March 1985, Caldwell (1985) has revised the volume of ivory which entered the international trade in 1983 to 644 tonnes and the figure for 1984 is 357 tonnes. The estimated mean tusk weight is now higher at 7.2 kg.

It may seem impractical to implement either a culling strategy or that of waiting for natural mortality to produce the harvest from stable populations. The culling option will be unacceptable to many government authorities and private conservation organisations; the non-hunting strategy may be acceptable to both of these groups but totally rejected by the poacher. It is essential to define objectives for the management of elephant populations, and such objectives must be within the realms of feasibility to achieve. But one thing is certain: whether the objective is to promote elephants for tourist viewing, or to maximise a return of ivory for trade, the present system of management in general in Africa is achieving neither of those objectives. Pilgram and Western (1984) point out that a substantial decline in the number of elephants is to the long term advantage of no one involved in the ivory trade, whether it is the producers, traders or artisans carving ivory. Equally well one might add that it is not the wish of governments and conservationists.

Broader issues

Parker and Bradley Martin (1983) argue that human increase is the driving factor determining the decline of elephant. With a human population growth rate of about 3%, elephant range is declining steadily. I do not argue with this: the question is whether elephant populations are declining faster than they need to in order to make land available for humans. In the Central African Republic an area of some 200 000 sq km in the east of the country is virtually uninhabited, yet the elephant are being heavily hunted throughout the area. Gangs of Sudanese travel great distances on horseback to hunt elephant, and poachers camps are established in the depths of the area for months at a time. The exports from C.A.R. in recent years are sufficient evidence of a rate of exploitation far exceeding human population growth. The Congo and Gabon are large countries with very low populations (under 2 million) in relatively large areas (over 250 000 sq km). Indeed, in these countries the net flux of humans is into urban areas and rural densities are declining. The mere fact that illegal hunting takes place in certain National Parks is an indication in general that forces in addition to a need for land are driving the process.

Perhaps it is a mistake to separate the simple land hunger aspect of the problem from the broader issues of the economic situation. With the population increase in Africa accompanied by economic decline, there has arisen a large sector of the population who are in severe financial straits and who have to be opportunistic for survival. Ivory provides a partial solution to their problem. Better managed, it could provide far more. Parker and Bradley Martin argue that the future of the elephant lies in a series of National Parks, and it may very well be that the present situation is leading to that end. However, it is a pity that it should be so in large parts of Africa where there are adequate areas to support elephant profitably for many years to come without conflict with humans.

The economic arguments for conserving elephant should not be advanced too far. Elephant farming as a form of land use is not compatible with human agriculture and generally not as profitable, particularly when the current government policies in Africa are aimed at a state monopoly of all wildlife. Perhaps the only place outside of National Parks where there is a justifiable role for elephant is in marginal land, and in areas which are not yet required for human settlement. Pilgram and Western (1984) argue that present strategies

for harvesting elephant are economically unsound, but care should be exercised here too. The logical conclusion to such arguments is given by Clark (1976). Elephant can be regarded as a living form of capital (large grey dollar notes) and as long as they are allowed to roam free outside of a bank, the maximum return on such capital is about 5% - their rate of increase. It appears sound economics to take all the capital in one fell swoop and put it in a bank where it will earn 10% interest, rather than let it continue to be unprofitably invested. Certainly this is the short term view of the poacher who competes with other poachers for the resource. However, slick as Clark's argument is, it does not fully cover all aspects. It ignores the matter of capital appreciation: dollar notes which are sitting in a bank vault do not appreciate as capital, whereas the elephant population which is alive and using the land does. The living asset is similar in some ways to the ownership of a house: it provides a real security which defies economic fluctuations. It ignores also the new cost of a substitute for the product, and if a substitute cannot be found, then cost must be measured in loss of employment of people dependent on the resource. In general, bank rates are lower than inflation rates so that any apparent improvement in form of interest on capital may be illusory. The centralisation of capital caused by putting the value of elephant in a bank is not an economic improvement in terms of distribution of wealth. Where the living resource could provide dividends to many people, dead it benefits only a few. Finally, the aesthetic value of living elephant has been left out of the equation, and this too has a real worth.

All governments in Africa have declared policies to conserve elephant, which are generally not founded on economic theories. The quota system has arisen from within Africa as one step towards achieving that goal. It would be naive to think that overnight the mere declaration of a figure is going to save the lives of any elephant. It represents rather a wish to see a certain state of management in place. I find myself caught on the horns of a dilemma in having to recommend a certain quota for Africa. I have been counselled that if the quota is too low it will achieve nothing but to send the trade underground: equally well it is against all management principles to recommend too high a quota if the estimates for elephant numbers are correct and the present age structures of populations are as unbalanced as the evidence suggests. The only valid approach I feel I can take is to recognise the sincerity of the government technical authorities in each country in their stated wishes to set a quota which will not overexploit elephant, and recommend to the best of my technical ability the upper limits of such a quota.

I don't believe it is possible to reach the ideal management programme in one or two years and for that reason I have recommended a gradual reduction in the quota as the age structures of the populations are restored and the yield of ivory increases. I have pointed out an alternative management programme which will produce more ivory in the long term by keeping elephant populations in a state of maximum growth and culling them to prevent their numbers from exceeding a certain limit.

What will be the outcome at the end of 1986 if, as a result of declaring quotas which are far lower than the amount of ivory actually harvested, quotas are greatly exceeded or there are large stocks of ivory waiting for the following year to obtain permits from the governments concerned? This assumes that the owners of the ivory have not already found an alternative way to export it. Perhaps the question should be asked in another way. What should a government do when confronted with a situation which conflicts with its own declared policy? Either it must implement the policy using the full force of the legal system at its disposal, or it must recognise the impossibility of implementing its policy and look for alternative methods to achieve the same

goal in a manner more acceptable to its population at large. This is discussed further in the next chapter on administration.

I am deeply conscious of the dangers inherent in perpetuating a sense of crisis in this volatile, highly charged issue of the ivory trade. Parker (1982) has pointed out the considerable damage which has been done to conservation by such actions. I prefer to align myself with the statement made by Pilgram and Western (1984a): "If it would be premature to view our results with alarm, it would nevertheless be unreasonable not to view them with concern." In the countries I have visited, I don't believe there is much danger of extinction of elephant, even locally, in the immediate future. Parker (1984) has pointed out that even in those countries where elephant should theoretically be extinct on the basis of human densities, some survive in refuges and appear to be finally exempt from man's predation. I feel strongly, however, that a great deal more could be done to improve the management of those elephant surviving in countries which have not yet reached the point where human densities exclude extensive elephant ranges.

3. ADMINISTRATION

This chapter deals with administrative aspects of the ivory trade with particular reference to the proposed quota system. I have allowed myself to address some administrative matters outside the confines of the quota system where I believe that these are important to elephant conservation. The chapter is divided into three main sections:

INTERNATIONAL PROCEDURES

- which deals with procedures necessary for the export of ivory from producer countries to other continents and other countries in Africa.

INTERNAL ADMINISTRATION

- which deals with internal administrative procedures which will not be addressed by the rules binding CITES Party states, but are nevertheless important to the working of the ivory trade and the quota system.

INDIVIDUAL COUNTRIES

- which is a report on my visit to each country, and deals mainly with the specific policies and administrative practices of those countries.

AUTHOR'S NOTE

This chapter has been revised to take into account the results of the proceedings of the 5th meeting of the Conference of the Parties to CITES which was held in Buenos Aires (Argentina) in April/May 1985. The original report was presented at the meeting.

Introduction

Before discussing administrative procedures it is worth considering the various ways that illegal ivory may arise, and the extent to which the quota system may reduce these. Many people feel that the international trade in ivory is the major factor responsible for the decline in elephant numbers, and that, if this could be brought under control, the future of elephant would be assured. This is not necessarily so.

a) Elephant may be illegally killed for ivory which is sold inside the producer country and used in the domestic carving industry.

b) Illegal ivory may be exported without documentation, either bypassing customs or through corrupt officials, and it may enter the importing country in the same manner. Export of ivory in diplomatic baggage is an example of this.

c) Illegal ivory may receive CITES permits from a corrupt official in a producer country and be exported under the quota system. To some extent the referral procedures agreed upon in Buenos Aires may address this problem.

d) If an inflated quota is submitted by a producer country it may "launder" excess ivory from neighbouring countries and/or its own ivory which exceeds any reasonable amount from management. This would require a generally corrupt agency immune to world opinion.

e) Illegal ivory may be used for a barter trade within Africa, with no immediate concern for international export (see **Individual Countries - Malawi**, this chapter).

f) Elephant may be illegally killed for meat or protection of crops and the tusks arise as a totally secondary issue.

The quota system will have little or no effect on any of the above causes of elephant mortality. Only law enforcement and responsible administration within the producer countries can reduce this illegal traffic.

The area within which the quota system may be most effective in limiting the illegal trade will be in those cases where the illegal traders are attempting to operate within the existing framework of rules for export established within the CITES forum.

INTERNATIONAL PROCEDURES

Most of the following procedures are contained in the **Resolution of the Conference of the Parties** (Appendix 11), and where this is the case I have referred to the Resolution as Conf. 5.12 and used the reference letter for the particular paragraph (e.g. Conf. 5.12 - a). A further document which enlarges on the role of the CITES Secretariat, Doc. 5.22.1 (Rev.), is given in the same Appendix.

1. Ivory producing countries to set quotas (Conf. 5.12 - a, c & e)

All countries approved of this proposal and understood that according to the Resolution they would be required to advise the CITES Secretariat in writing of their quotas by 1 December prior to the start of the quota year. It was agreed that if the quota was not submitted by the deadline ivory would not be exported until the condition had been satisfied.

2. Only countries with elephant populations to have quotas (Conf. 5.12 - a)

This is implicit in the above statement but I have deliberately emphasized it separately. Every country I visited felt very strongly that a country without elephant could not have a quota. Burundi was referred to time and time again as a country with no elephant which laundered ivory from its neighbours. This would apply not only to African countries but also to **free ports** (such as Jeddah and Djibouti). Such ports accept illegal ivory with forged certificates of origin from producer countries and grant export permits. Sudan has been a victim of such practices.

3. Quotas to be stated as a number of tusks (Conf. 5.12 - a)

This is a key point. One country which I visited felt the quota should be set by weight but finally agreed to a number of tusks. The purpose of the quota system is to limit the number of animals dying annually and clearly this must be done on the basis of a simple index such as tusks. The system provides the incentive to export only tusks of a high weight in order to maximise the earnings from a given quota, and this should be beneficial for elephant populations.

4. Export permits from countries with quota (Conf. 5.12 - b)

Export permits for raw ivory from such countries will be regarded as a necessary and sufficient condition for their import into non-producer countries. This clause is specifically directed at countries who attempt to introduce legislation affecting ivory imports which is over and above the requirement established in the CITES forum. All countries I visited deprecated the recent moves by the EEC and Australia to introduce internal legislation over and above the requirements established by CITES and felt that it weakened the whole CITES structure.

5. Role of the CITES Secretariat (Conf. 5.12 - d)

a) Monitoring the Ivory Trade

The quota system will not be workable unless the entry of tusks into the trade is continuously monitored throughout each quota year. It would be

impractical to expect that customs offices or CITES Management Authorities could effectively implement the system at the entry points to importing countries. It would be of little value to wait until the end of the year to examine the final export quotas as indicated by annual reports of Party states. The Ivory Unit proposed in Doc. 5.22.1 (Rev.) by the CITES Secretariat may solve the monitoring difficulties. A central data base will be maintained which contains the numbers of all tusks in trade and the Unit will be notified by exporting countries of full permit details whenever a shipment of ivory is authorised for export.

b) Referral Procedures

The referral procedures incorporated into Doc. 5.22.1 (Rev.) should greatly reduce the number of cases of ivory shipments entering importing countries with incorrect or fraudulent documentation. There have been several recent instances where ivory shipments have entered consumer countries on export permits not granted by the CITES Management Authorities in the country of origin. I exclude legitimate cases of re-export from this. I was informed of cases where export permits for Sudanese ivory were granted in a free port on the strength of false certificates of origin. There have also been cases where export permits issued by the CITES Management Authority in the country of origin for small amounts of raw ivory have been altered to cover large shipments. Sudan has one clearly documented case of a permit for 2 tonnes being altered to 62 tonnes.

The measures agreed upon by the producer Party states at Buenos Aires could limit further occurrence of such cases. Copies of all export permits issued by producer countries will be sent to the CITES Ivory Unit and to the CITES Management Authority in the importing country before the shipment in question is admitted to the importing country. This will allow permits to be validified before a shipment is cleared by customs, and should deal with cases where export permits are issued by a free port without the knowledge of the Management Authorities.

No importation should be allowed without the prior approval of the CITES Management Authority in the exporting country, either directly or via the CITES Secretariat. This might seem to contradict paragraph b) in Conf. 5.12 covering export permits, but all that is intended is a system of cross-checking prior to completion of import formalities. Such a process of referral need not delay the import significantly if it is taken into account at the time a private dealer initiates import procedures and if the flow of documentation and information is in accordance with the measures agreed in Buenos Aires. The practice is used by many countries for all exports of live animals.

All producer states were adamant that the role of the Secretariat in handling referral procedures should be primarily that of assisting producer countries. Any connotation of the Ivory Unit regulating the trade was not acceptable.

c) Circulation of a List of Quotas

The Secretariat will circulate a list of quotas to all Party states early in the quota year. I found that most producer countries were anxious to see the quotas set by other producer countries. There is concern in the central African states that high or low quotas set by their neighbours will influence the movement of illegal ivory between states.

d) Quota System Manual

I asked in each country whether it was felt desirable to submit quotas to the CITES Secretariat using standardised forms and a methodology such as that provided in this report. Most countries approved of the idea, and were not averse to having their quota calculations open for inspection. The majority of countries asked that the methodology was written in the form of a handbook for their reference at the time of setting quotas.

The Secretariat has agreed to prepare a manual for circulation to all Party states (and non-Parties) which outlines guidelines for setting quotas and procedures to be followed for trade in ivory following the acceptance of Resolution Conf. 5.12.

6. Marking of tusks (Conf. 5.12 - f)

More than half of the countries visited were not marking tusks in accordance with Resolution Conf. 3.12 which specifies that metal punches must be used to stamp the code letters for the country of origin, the serial number of the tusk, the year of export, and the weight of the tusk at the lip line of the tusk and this should be indicated with a flash of colour. Many were allowing the export of totally unmarked tusks, or tusks which had been marked by private exporters rather than government authorities.

In discussions with numerous people on the subject I found many who were of the opinion that an indelible felt tip pen provided as good a mark as that of a metal punch die and was considerably easier to read. Notwithstanding the provisions of Conf. 3.12 for metal punch dies, I feel that clear markings which provide the information demanded by Conf. 3.12 should be accepted. [This is not to say that I approve of the disregard of the stipulations of Conf. 3.12: I feel that countries who are not abiding by the agreement should come forward with a resolution to alter it.]

Unmarked or irregularly marked tusks should not be accepted by any importing country. A key feature of the proposals arising from Buenos Aires is the maintenance of a data bank by the CITES Secretariat which contains the registration numbers of all tusks in trade. Without a properly implemented marking system adhered to by all producer and non-producer countries which hold stocks of raw ivory the quota system cannot be effectively implemented.

Importing countries cannot be expected to know which tusks have been marked by the CITES management authorities of the exporting country and which have been illegally marked by a private citizen. There is a need to develop a specific mark for tusks, in addition to the information required under Conf. 3.12. This mark, be it a distinctive punch die with a symbol peculiar to the country, or a transfer which cannot be removed, should be held only by the management authority and unavailable to all other people.

The suggestion has been made that the number of tusks in the quota for a country be included in the marking on each tusk. After due consideration and discussions with many people I do not recommend this. Firstly, it demands a large amount of work to mark the same quota number on hundreds of tusks. Secondly, where ivory is exported first to an intermediate country and held until a later quota year this will lead to confusion and possible rejection of legal shipments. In countries where tusks can be legitimately exported from more than one centre, at the start of the quota

year blocks of numbers will have to be allocated to each of such centres for their use during the quota year. If the purpose of marking the quota on the tusk were to monitor the progress in exports during the year, then the above situation would render the exercise meaningless: it would be impossible to tell from the number stamped on the tusk how many tusks had been exported at any stage during the year.

I have considered systems which include additional data on tusks such as a code letter for cause of death and a code indicating whether the tusk is whole or a piece of a tusk. Richard Bell (pers. comm.) has developed this further with ideas which could provide a large amount of information for monitoring and administration of the ivory trade both internally and internationally. However, it is largely the responsibility of producer countries to extract such information as part of the quota setting system (this is discussed further in the next section). There is very little point in developing more elaborate marking systems until all countries are implementing the recommendations of Conf. 3.12.

7. Date stamped on tusks and date of export permit

Importing countries should only accept shipments where the date of the export permit coincides with the year of the quota established for the country concerned (Conf. 5.12 - g).

An important point arises here. In many countries tusks are routinely stamped according to CITES Conf. 3.12 as soon as they are acquired. This means that they may be stamped with a year which is prior to the current quota year and a number which bears no relation to the quota. Many of these tusks may never be exported but will enter the internal market. If the quota system is to work it will be impractical to require that every tusk exported is stamped with the current year and a serial number lower than the quota for that year.

The present tusk marking system should be applied as it has been since 1981, and the number marked on the tusk will bear no relevance to the quota system. The data bank maintained by the CITES Ivory Unit will be the main check on duplicate or fraudulent tusk numbers.

8. Re-export of raw ivory

It is important to define clearly at what stage a tusk shall be deemed to have been exported. The following options exist:

When it has left the country of origin.
When it has left Africa.
When it has reached the country in which it will be worked.

The only practical option is the first. The restrictions of the proposed quota system will only be applied **once** and that is on the first occasion when the tusk leaves the country of origin and enters another country, wherever that country is located in the world. All other movements of the tusk will be treated as re-export and re-imports.

Consider the hypothetical situation where an ivory dealer in South Africa imports a tusk from Zimbabwe and satisfies all procedures required in a given quota year (say 1986). If the dealer then decides to hold that tusk for several years before re-exporting it to Hong Kong, what requirements under the quota system for the year concerned (say 1989) should he be

required to satisfy? The tusk clearly should not be counted as part of the quota for Zimbabwe in 1989, and neither should it be part of the South African quota for 1989. The dealer should only be required to prove that the tusk was acquired from Zimbabwe legitimately in the year of the 1986 quota. For this he would require copies of the original export and import permits. The same would apply to any further re-exports of the tusk. There is the danger this may be used as a method to export illegal ivory. The responsibility lies with the government office handling the export to check that the original documents are not false, and that those original documents have not been used for a prior export. If there are any doubts about the export, the referral procedures discussed in subsection 5 provide a final check.

9. The quota system applied to non-Party states (Conf. 5.12 - h)

The non-Party states which I visited (Somalia, Ethiopia and Chad) were willing to abide by the procedures of the quota system.

10. Trade in worked ivory (Conf. 5.12 - j)

I recommend that CITES abandon all attempts to regulate or monitor the import and export of worked ivory, notwithstanding the provision for the continuance of the practice in the Resolution of the Conference of the Parties. I justify and qualify the recommendation below:

a) This was recommended by Parker (1979, page 225).

b) Good law should be workable (CITES Doc. 3.10.4). The present procedures for worked ivory are not workable and are resulting in much paperwork which contributes little to elephant conservation and weakens the effort most needed - the control of the traffic in raw ivory.

c) The control of the worked ivory trade is essentially a domestic problem which international legislation cannot address. A country may choose to back its internal efforts to regulate the worked ivory trade with CITES documentation, but should not expect this to affect any other country (e.g. Zimbabwe does this simply to assist tourists leaving the country, and to elevate the status of ivory within the country). The worked ivory trade can only be controlled within Party states.

d) I am aware that one of the chief reasons for continuing to enforce controls on the trade in worked ivory is because of the problem with ivory from the Asian elephant which is included in CITES Appendix I. The above point applies: it is up to the Indian authorities to solve the problem internally. Their failure to do so is putting the remainder of the world to considerable inconvenience.

e) The term worked ivory should follow the definitions of Conf. 3.12 and not include polished tusks or pieces of ivory which are incompletely worked. Private dealers in C.A.R. are exporting small polished tusks as "works of art" in order to circumvent their domestic legislation which requires that all raw tusks exported weigh more than 10 kg. Dealers in Sudan are cutting ivory in small cylinders suitable for the manufacture of seals and exporting these as worked ivory to circumvent the government ban on raw ivory exports from Sudan.

11. Minimum size of tusk in the trade

There should be no restriction on the minimum size of tusk admitted to the international trade. Whilst I appreciate that efforts to introduce this limit are motivated by a desire to conserve elephant, it is not practical for the following reasons:

a) Certain countries obtain tusks from all age classes of elephant through legitimate culling programmes, and often prefer to export such tusks rather than have the problem of monitoring their progress through the internal carving industry within their own countries.

b) Animals with small tusks die naturally.

c) Certain countries have banned all ivory dealing and carving within their borders and have the limited options of destroying such tusks or exporting them.

d) A significant sector of the worked ivory industry in consumer countries deals exclusively with small tusks and it seems illogical to ignore the market which they provide.

e) Placing a limit on the size of tusk which can be exported is unlikely to produce the desired effect - that only elephants with tusks larger than that size will be killed. In all the central African states which I visited small tusks are used in the domestic carving industries and such tusks are largely illegally obtained. The international trade cannot address this issue: it is solely dependent on the internal administration and law enforcement of the producer countries concerned.

f) Many producer countries have set a limit on the minimum size of tusk themselves, both for hunting and for export. This is the only practical way in which a threshold size of tusk can be enforced.

12. Export of small tusks and pieces of ivory

In all countries I visited there was general agreement that it was impractical to stamp small tusks and chips of ivory. Frequently the small tusks turn into ivory chips when they are subjected to the impact of the metal punch die. Such small items are numerous yet add up to a trivial part by weight of the international trade. The completion of documentation for them is tedious and injustified. All producer countries would prefer to see a system which permitted pieces of raw ivory and small tusks which weigh less than 1 kg each to be exported in lots with the number of pieces and the total weight of the consignment being stated on the export permit. Each lot would have to be discrete: that is that for every crate or box containing such pieces the weight and number would be given separately from any other lot. Both the number of entire tusks and the number of broken pieces within the lot would be stated.

The question then arises of the relation of such batch shipments to the export quota of a country. Should each piece in such a lot be deductible from the quota? My feeling is that entire tusks should be deducted from the quota while broken pieces should not. CITES primary concern is for the number of animals dying and a pair of small tusks represents an animal as much as a pair of large tusks. To make the system workable, it is probably best in the original submission of the quota to the CITES Secretariat to

specify that over and above the quota of tusks marked in accordance with Conf. 3.12, the country concerned intends to export a given number of tusks each less than 1 kg in weight which will be exported in a number of batches. When such batches arrived at a customs point they would be identified by a Lot Number which would be related to the number of lots specified in the quota (e.g. "Lot 2 of 7 lots, Kenya quota").

13. Confiscated ivory

Paragraph b) in Resolution Conf. 5.12 states that "export permits for raw ivory issued by producer Parties who have set quotas ... be regarded as consistent with the conservation of elephant populations ... in the country of origin ...". Confiscated ivory clearly does not accord with this provision. Whilst such ivory is obviously the legal property of the state once it has been seized, and there is no good reason why the state should not export it for gain, it cannot be claimed that the killing of the elephant concerned was in any way consistent with conservation.

In most countries I visited, the largest part of the quota would normally come from confiscated ivory. It makes a mockery of the quota setting procedure to carefully calculate a number of elephant which will die through planned management programmes and then dwarf this with a vast number of tusks which will arise from confiscation.

All countries were aware of the paradox and felt that the solution lay in keeping the bulk of confiscated ivory totally separate from the quota as advised to the CITES Secretariat. In the quota submission a nominal provision would be made for a minimum amount of confiscated ivory that could be expected in the course of any given year. Any significant amounts over and above this would be exported only after advice to the CITES Secretariat that such an amount had been seized and it would be exported over and above the existing quota. The Secretariat would approve the export and notify the importing country.

This raises the question in general of procedures to be adopted in the case of a country wishing to exceed it its initially stated quota. Legally there is nothing to prevent it doing so, and it seems that the best course is simply that the country advises the Secretariat when this is about to occur, and the appropriate notification is sent to other CITES Parties.

An alternative would be to demand that all such ivory was held over to the following quota year when normal provision could be made for it under the heading of "government stocks on hand". The objection to this is the loss of funds which would result from such a practice, and no conservation gains would be achieved by the action.

14. Non-Party states and states not conforming with requirements of CITES

The provisions of Conf. 5.12 - h), k) & n) were tacitly accepted by all states. There may be cases where transit of ivory through non-conforming states may be necessary on logistic grounds, and I cannot see the evil in this, provided the ivory stays "in bond" during its period of transit. Certain countries (e.g. C.A.R.) do not allow the transit of ivory because of a loss of potential revenue to the government and insist on the consignment being imported and re-exported so that taxes can be levied on entry and exit.

There is a real danger that the introduction of the quota system may promote the illegal ivory trade among non-Party states. To circumvent the new system it requires both the exporter and importer to ignore procedures, and it may well be that certain countries are prepared to do this. For example, if Burundi exports illegal ivory to Singapore there is little that CITES can do to prevent it.

15. Registration of ivory stocks (Conf. 5.12 - 1)

This is an important procedure necessary to monitor the total annual trade in ivory and the amount relating to the quotas of producer countries. The volume of ivory in trade in any given year consists of an amount originating from animals which died in the current year and an amount from animals which died in previous years. In compiling statistics, the most difficult part of the exercise is to separate these two categories. Clearly, the primary conservation issue is the number of animals which have died in the current year, and this cannot be established unless all exports and re-exports of old stock can be identified and deducted from the overall total indicated by the number of tusks in trade.

The simplest way to establish the stocks of ivory not pertaining to the current quota year is for each country to register such stocks and advise the CITES Ivory Unit of the details. Such tusks would have to be marked in accordance with Conf. 3.12 before they were exported or re-exported.

At the Buenos Aires meeting certain non-producing states expressed concern about carrying out this task in their countries: however, it was pointed out that if all producer countries were expected to comply, there could be no good reason for non-producer countries not to do likewise.

16. Regional co-operation

A matter which has plagued the export and import statistics for raw ivory has been the illegal export of ivory originating in one country by private dealers in another. It is important to move towards a situation where each country exports its own ivory - regardless of how great an amount is involved. For this reason bans on exports and hunting which drive the trade underground should be avoided.

There are important moves afoot in the central African countries to co-operate in preventing the export of each other's ivory, and to mount a major anti-poaching campaign which goes beyond the borders of individual states. The Ministerial Conference of the Central African States for the Wildlife Conservation (MCCASWC) was formed in 1984 and the Secretariat has been established in Sudan. MCCASWC is presently raising funds to begin operations.

17. Continental co-operation

It became very clear to me in the course of visiting many countries that the price of ivory fluctuates from one part of the continent to another and clearly certain states are not realising the true value of the commodity. When ivory is being sold on government sales and through private tenders at a price below US $ 10/kg something is seriously wrong. This is acting against the interests of conservation: the commodity is too cheap and as a result does not achieve the administrative attention which it is due. Too many animals are being killed to make a sum of money which a few animals could provide with proper marketing.

Africa needs to be seen to be marketing its products competently, servicing its wildlife industry with good technical management, and policing its own irregularities. If such a situation existed the need for the international community to insist upon regulations for the trade in ivory would diminish considerably. In future years ivory will become more and more scarce and, if the African countries co-operate in keeping the price high, the resource can be of a great benefit to each country.

In each country I visited we discussed the possibility of forming a cartel among the producing countries to export ivory to maximum advantage. In the diamond industry in Africa all diamonds are marketed by a single organisation (the Central Selling Organisation) which has been very successful in maintaining the value of diamonds for the last century. The declared aims of OPEC are to achieve the maximum revenue from oil, and to make the resource last a long time. OPEC, to its disadvantage, only controls a portion of the world's oil and is always vulnerable to other countries' economic moves. The major African ivory resources are now effectively limited to about 13 countries, and if these countries could "get their act together" they could present a formidable front to the ivory consuming nations.

A possible structure for an Ivory Producer's Export Cartel (IPEC) is discussed in Appendix 13. The scheme attempts to build in the essential functions of marketing, policing and technical services which would be required to make such an organisation work. I do not put it forward as a recommendation, but rather as an option which if adopted might improve the current status of ivory and elephants in Africa. All countries which I visited indicated that they favoured the idea, and reactions varied from the positive to the strongly enthusiastic. I have no illusions about the difficulties involved in trying to establish such an organisation. Unlike oil and diamonds which are easy to monopolise, elephants are widely distributed and few governments, despite claiming ownership of the resource, are able to enforce their monopoly.

18. International co-operation

The success of the quota proposals relies both on the producer countries setting realistic quotas and doing their utmost to limit the number of elephant killed to the stated figure, and on the consumer countries implementing the full set of procedures called for on their part.

In several countries I visited in Africa I obtained evidence of the involvement of foreign diplomatic missions in substantial ivory smuggling using diplomatic privileges. I give three examples.

A diplomatic vehicle was stopped at a road block near a border crossing and searched by wildlife staff who were not aware of the full extent of diplomatic privileges. In the boot of the car were several rhino horns and large elephant tusks. The staff were later reprimanded by their own government for failing to observe that the visitors carried diplomatic immunity, and the case was dropped.

A one tonne pick-up vehicle was stopped by wildlife staff as it was about to enter the gates of an embassy. A search revealed that it was fully loaded with a tonne of raw ivory.

The cook of a diplomatic residence was bribed by wildlife staff to pass ivory out of the house while the diplomat was at his embassy. The government authorities recovered a large cache amounting to over one tonne.

The officials of the countries in which the incidents occurred have asked me not to reveal the names of their countries in order not to embarrass their own governments, who in all three cases did not react to the incidents for political reasons.

It would assist the cause of conservation if all Foreign Offices instructed their diplomatic staff serving in Africa that under no circumstances would the movement of ivory, or any other illegal wildlife products, be sanctioned in the name of diplomatic privileges.

INTERNAL ADMINISTRATION

There is a limited amount that can be achieved by regulation of the international trade in raw ivory. In my view the most critical area lies in the internal administration of producing countries. It is not my intention here to criticise the countries whose hospitality I have so recently enjoyed. What is contained in this section is intended to be general constructive advice and I have avoided referring to individual countries as far as possible. However, each country will doubtless identify remarks pertaining to its specific situation, and I apologise in advance for any offence caused.

I will begin by dealing with administrative matters what will affect the success of the quota system directly, and then discuss more general problems, which, until they are solved, will continue to frustrate the officials in various countries in all their attempts to gain control of the ivory trade. Given the present status quo - that is that almost all governments have a declared policy that all wildlife belongs to the state - I will consider those measures that are necessary to implement such a monopoly. Finally, I will look at alternatives to total state ownership which may have a greater chance of solving the long term problems.

In order to exercise control over the ivory trade (and wildlife utilisation in general) an orderly sequence of policy decisions and administrative procedures are necessary. I have tried to present these in a logical order. Failure to consider each step in the process is likely to make the overall organisation unsound. What is given below is not a framework for a conservation master plan, but rather a simple set of procedures for wildlife utilisation.

1. Control of the resource

It is essential that governments should be able to protect their wildlife resources and be seen to be in control. In all the countries I visited I listened to a consistent theme that the wildlife authorities did not have sufficient staff, funds and equipment to police the vast areas under their control. To a lesser or greater extent this is true: it has been the case as long as wildlife departments have been trying to assert their control. And yet I am not totally sympathetic. Some wildlife agencies are more successful than others in securing funds, and it depends to a large extent on the strength of the case put by the head of the department to the body controlling the country's budgets. Many wildlife agencies do receive sufficient funds from the treasuries of their countries and often end up with unspent funds at the end of the financial year. I was surprised at how many staff were employed in wildlife agencies, rather than the opposite. Certainly, the staff are inadequately equipped, but there are many donors in the wings willing to assist with equipment provided they are approached with sound proposals. I was depressed by the attitude that until funds were forthcoming, nothing could be done to improve the situation - because, in general, I don't believe it.

Anti-poaching work is the top priority. It is only in the field that the illegal killing of elephant can be stopped - not through international trade restrictions. It is well nigh impossible to confront large gangs of poachers who are armed with automatic weapons with a spear or an ancient .303 rifle, but it is here that higher authorities in the country must be approached. In many of the countries I visited the streets and airports

teemed with soldiers bearing the latest military weapons: it would not seem unreasonable to approach the military authorities for a loan of some arms or even the secondment of the present soldiers carrying the arms. Above all, strong leadership and motivation is needed in anti-poaching work, and this must come from a high level. It is regrettable that many high officers in wildlife agencies have never done anti-poaching work themselves and therefore are not competent to lead or organise patrols.

Illegal hunting can be contained by other less obvious methods which don't necessarily involve massive anti-poaching forces. Good detective work and the establishment of informer networks can result in a lot of arrests - often of the more important criminals involved in the ivory trade. The simple administrative step of inspecting, registering and marking all tusks produced by private dealers for export is a method of detecting ivory obtained illegally and provides sufficient grounds for arrest when irregularities are found.

If it is totally impossible to attempt any of the above then there is only one option: government should abandon its pretence to ownership of the wildlife resource and look for other solutions for its management. This is discussed further under subsection 8.

Before closing the subject of establishing control, a final vital point must be made. In several of the countries I visited the loopholes in the laws relating to acquisition of ivory are so large that anti-poaching work would be a waste of time. In these countries, the primary need is to address the next points in this section, before expending the time and effort of sending anti-poaching staff on fruitless exercises. They might catch one poacher with one elephant, but be forced to ignore a semi-legal hunter killing herds.

2. Policy and legislation on wildlife utilisation

In most African countries, the declared policies on wildlife utilisation, if they worked, would result in no more than a few tusks from international sport hunters which would never enter the trade anyway. I came across no organised cropping schemes or culling programmes which could legitimately provide the present ivory in trade. Most government ivory comes from confiscation, which cannot be called the result of management programmes. In Tanzania the largest amount comes rrom protection of agricultural crops - which, even if it is a somewhat ad hoc approach to management, is at least the result of positive government action.

The bulk of ivory is exported from producing countries by private citizens, and in many cases the quantities of ivory which they manage to amass for export cannot be reconciled either with legitimate quotas set by the authorities or with natural mortality of elephants.

I found it very hard to understand the dualism in the official attitudes towards this obvious contradiction of the stated policies. On the one hand there is legal provision for a minimal harvest of ivory, on the other large exports of obviously illegal tusks are sanctioned.

There is a need for every wildlife agency to ask itself critically "how will people get their ivory ?". The quota setting method in this report lists the various sources and provides a method to allocate amounts under each category. If the official government policy contains no provision for

wildlife utilisation of any form, it is pointless turning a blind eye to the fact that wildlife is nevertheless being heavily used all over the country. If bans don't work, then the next step is to accept that some sort of exploitation will happen despite government policy and the best option is to try to control it and keep it within manageable limits.

In many countries the wildlife officials see their brief as starting and ending in the gazetted protected areas. What happens in the remainder of the country is not their concern. The export quota of ivory will not simply be the result of a number of permits issued for sport hunting in defined hunting zones, in fact this will be the smallest part of it. The bulk of ivory will come from the unprotected elephant populations in no-mans-land. Some authority has to take the responsibility for this.

The system of "collection" which is still practised in some countries requires comment. A permit allowing an individual to purchase found ivory from villagers may have been reasonable in the days when modern weapons were absent from the African countryside: today, it is nothing less than giving carte blanche for elephant slaughter on a grand scale. It could work with highly knowledgeable wildlife officials who inspected every tusk collected, and who were prepared to put the collector behind bars if he had a single tusk in his possession which had not come from natural mortality. But where collection is being practised, the wildlife authorities do not even inspect the tusks.

A problem which has haunted wildlife officials since the turn of the century has been how to secure the ivory from natural mortality. If adequate rewards are paid to private citizens to hand it in to government authorities, then the rewards themselves are a stimulus for illegal hunting. If rewards are not paid, the person who finds the ivory would prefer to sell it to the collector or illegal dealer. With present policies in Africa very little "found" ivory finds its way into government hands, except those tusks picked up by the wildlife staff. Government could afford to pay high rewards for found ivory and avoid encouraging illegal hunting if wildlife staff knew how to differentiate between ivory which has been hacked from an elephant's jaw, and ivory which has been drawn from a skull found in the bush. Parker (1979, page 169) has given detailed criteria for doing this. The person bringing in tusks from a freshly killed elephant could be jailed without further ado.

3. Administration of hunting

Having decided on the legitimate offtake of elephant, the authorities need to put in place an administrative system to ensure that only those elephant which are on the quota are killed. This involves:

a) deciding who will use the quota. It may be shared among sport hunters, both resident and international, citizens carrying out cropping for commercial gain, or the wildlife staff themselves carrying out control hunting or culling;

b) issuing a permit to hunt, which is specific regarding the numbers, age and sex of the animals to be hunted, and the locality where hunting is to take place;

c) supervising the hunting operation. Ideally, a member of government staff should accompany the hunting party on all excursions from its base. Where this is not possible, hunting parties should be made to

report at a manned entry point to the hunting area both on arrival and exit, and their vehicle checked for the possession of trophies not provided for on the hunting licence. Failing this, the hunter should report to the nearest government wildlife officer immediately on completion of the hunt; and

d) registering the tusks. The representative of government should inspect the hunting permit, enter the permit number and the name of the hunter into the station ivory register with the weight and description of each tusk. The tusks will be marked with the current entry number of the register, and an ownership certificate issued. Government may demand that these same trophies are later presented in the main administrative centre for confirmation of registration, and the issue of export documentation if the hunter requires it.

In certain countries tusks are not registered, marked, or inspected from the point at which they originate in the field to the point of export. I am not referring to illegal tusks. Where "collection" is practised, such ivory is legal within the government laws at all times. Frequently the tusks are marked by the dealers themselves, not because the government requires it but because the importing country does. This system is open to every abuse possible.

4. Movement of ivory within the country

After registering all tusks at their point of acquisition in the field, the ideal system for controlling the movement of ivory inside a country is to have all tusks registered, marked and inspected at a single main centre, by a single responsible agency. Government sale of ivory and the export of all tusks should take place from that centre.

In a large country this is not always practical. It is not economic to move ivory unnecessary distances, particularly if there are convenient points for export or internal markets near the place where ivory originates. International safari hunting clients do not enjoy bureaucracy or delays in obtaining their trophies and it is necessary to be flexible on this point. However, in such cases it is essential that the officer in charge of ivory registration in each centre is highly responsible, and if he is likely to sign CITES documents, his signature should be registered with the CITES Secretariat.

In several countries in Africa the flow of ivory is highly complicated. Tusks are handled by more than one agency, each with their own sphere of authority, and the decisions whether ivory is sold in the district where it is acquired, whether it is exported, or whether it is moved to the main centre appears somewhat arbitrary. All this need not be important, provided the authorities know the numbers of tusks and where they are stored at any one time.

The greatest concern should be with ivory which is in private hands. In more than one country this ivory moves without checks at any stage: it is not registered in the field, and it is not inspected before export. The supply of ivory to most carving industries is also uncontrolled, where even a simple system of occasional roadblocks would provide a partial check on the ivory traffic. Whilst the Zambians may not be very successful in containing illegal hunting, through the use of roadblocks they are very successful at apprehending ivory which is being moved.

5. Ivory sales

Apart from sport hunting trophies, it is desirable that all ivory originating within a country is sold through the government. That is, government should be the sole source of ivory. If private dealers wish to export, they should buy their ivory from government, except for the odd isolated purchase of a pair of trophy tusks from a private citizen, which transaction would in any case be registered with government. The only valid exceptions to this that I can think of would be in the case of a registered dealer in ivory who was running an elephant cropping scheme with government permission. There would be little point in him selling the tusks to government and buying them back (I know of no such scheme in operation).

In most Francophone countries the government handles very little ivory, apart from occasional sales of confiscated ivory. The trade remains largely in private hands with various taxes being paid for certificates of ownership and export permits, and there is often a surcharge or duty on the weight of ivory. I believe this is the source of many of the ailments in the ivory trade in such countries. The lack of interest shown by governments provides all the opportunity for inclusion of large quantities of illegally owned tusks in export shipments.

I have been amazed at the low prices obtained for ivory by the governments in most countries of Africa. To a large extent I attribute this to the sale of ivory by tender. The opportunity for irregularities in tender transactions is very high: a corrupt official can arrange external payments for himself without arousing suspicion. However, it is not the only explanation. In the Francophone countries ivory is frequently sold by auction, but because the sale is only attended by a limited number of local dealers, who are mainly in collusion anyway, prices remain very low. When ivory is sold by fixed government price, this is also extremely low.

A properly advertised auction with international buyers present, conducted by professional auctioneers, and with the ivory well presented in organised lots, is probably the best way to conduct sales. The prices obtained are the highest possible under present circumstances, and there is little opportunity for collusion among buyers or corrupt practices among government officials.

Civil servants in general, and wildlife staff in particular, are the worst of financial managers. Perhaps it is because they are responsible for public funds and not their own money. I have been appalled at the very large stocks of ivory which are allowed to accumulate in government hands before sales. Unsold ivory is the equivalent of uninvested money - it does not earn interest. An astute businessman might hoard ivory as a speculation against a price increase, but this is not the explanation in the case of government officials.

Failure to sell regularly, and failure to obtain the best price for ivory is no less than gross financial mismanagement.

6. Export of ivory

The international procedures for export are well known to most governments, and particularly to private dealers engaged in the ivory trade. I do not intend to repeat the CITES procedures here, and wish only to remark upon certain internal practices which I came across during this

trip. In one country, private dealers obtain orders for ivory by approaching overseas buyers with the promise to be able to supply very large quantities. On receipt of an order, they then apply for an export permit and set about assembling the shipment - which may amount to as much as 40 tonnes, none of which they have in hand at the time of soliciting the order, and none of which can be obtained through legal channels. It is no good saying "naughty, greedy merchants": the fault lies with the government of the country in the practices it is prepared to accept. The country concerned is desperately short of foreign exchange, and any order which carried with it the promise of a large amount of money is enthusiastically welcomed by the trade authorities who issue the export permit. It still requires the sanction of the wildlife authorities, but it would require considerably more power than they have for the permit to be refused.

In the central African countries there have been significant movements of ivory between countries using certificates of ownership to clear import formalities, rather than full export permits. Traditionally such movements have been treated as "internal trade" rather than full export. The certificates of ownership can be bought for a trivial sum, and many are simply fraudulent. Zaire has recently asked the Central African Republic to allow no further imports of its ivory into C.A.R. unless accompanied by full CITES export permits issued in Kinshasa. This is evidence that the CITES attempts to control trade are having some beneficial effects.

7. Control of internal ivory dealing and the carving industry

By far the largest problem throughout the Francophone countries and a number of the Anglophone countries is the illegal ivory used in the internal carving industries. I may well underestimated the amount at 85 tonnes in the previous chapter: it would not surprise me if it were double that figure.

In every country I visited the authorities were aware that by continuing to sanction the sale of worked ivory from retail outlets and on the street, that they were condoning an ongoing illegal harvest of elephant. When I asked where the tusks for carving came from I was told quite simply "We don't know. None of them are registered with us." It might appear an attractive solution to simply close down all ivory retail outlets, sales, carving industries and the like, but I don't believe it is the answer. The industry provides a livelihood for many people and is an expression of culture and art forms. To ban it will result in underground traffic of worked ivory, and unfair advantage for surrounding countries. Far better to recognise it, and to regulate the industry - as the officials in most Francophone countries are trying to do at the moment.

It is important to ensure a legitimate supply of ivory for such an industry, and this is the next step the Francophone countries will have to take after completing their registration of all persons engaged in the trade. There is a problem in carrying out this registration: in Gabon for example, only one artisan has come forward - obviously there is a fear of government reprisals. I believe that the long term future relies on a close relationship between the carvers, who should form a strong trade association, the hunters, who should either be employed by the carvers or government, and the government itself. The wildlife authorities might set a quota of animals to be cropped legitimately for the internal carving industry, and allow the carvers to employ their own hunters to provide them with the ivory. Government would assign designated areas to such

hunters and require them to keep those areas free of all illegal hunting. All tusks from the hunters would be registered by the wildlife authorities and, through this process, control will have been established.

I do not believe the answer lies in government taking over the industry. There are certain areas where private initiative is important, and a civil servant's attitude is not conducive to the best productivity. Tanzania and Malawi recognise this and, while they have banned all private ivory dealers, government provides the ivory for private carvers. Zambia and Somalia have nationalised the carving industry totally, and it remains to be seen how successful they are.

In Zimbabwe the industry remains in private hands but is tightly controlled. All ivory dealers and carvers are registered with government, and pay an annual licence fee. All retailers of ivory are also registered, but pay no dues. Dealers can obtain their ivory only from the government sales and may export it or sell to carvers. A certain provision is made on government sales for some ivory which may not be exported to ensure that the carvers are not left without a supply. Some citizens carry both dealers and carvers licences and effectively sell to themselves. Dealers, carvers and retailers submit a monthly return to government stating ivory purchases and sales. The dealer gives the tusk numbers of all tusks purchased from government and the names of the carving industries to which those tusks were sold. In the carvers' returns are stated the names of dealers from whom tusks have been bought and the tusk numbers. They also describe the worked items made from each tusk and to which retailer these items have been sold. Retailers give the names of all carvers from whom they buy worked ivory during the month, and all persons in the public to whom they have sold products. In this way the trade can be totally monitored and any "shady" operator can be watched closely. It has in fact had the effect of removing such operators from the trade, and the country is now left with the more committed dealers and artisans.

8. Recording systems for information on the ivory trade

As soon as the technical staff in each country begins trying to set a quota under the new CITES proposal, they will find that they do not have the essential information on the number of tusks to be expected annually from natural mortality, confiscations, control hunting and so on. I exclude no country from this statement, including my own. At the beginning of the first year of the quota system therefore it is very important that each country puts in place a structure for acquiring the necessary data by the end of the year. It is worth assigning one member of staff specifically to the analysis of statistics from the ivory trade during the year, and ensuring that all field stations are providing data in the form required. The value of the resource in financial terms more than justifies the expenditure, leaving aside any conservation issues.

The following system of data collection should be installed at the outset of the first quota year and continued routinely as part of the management of elephant populations.

a) **Elephant deaths register:** Every field office of the wildlife agency should maintain a register in which, as a minimum, the following items are recorded:

- Date of death or discovery of carcase.
- Location of death.

The sole resource that many governments have to protect their wildlife is an extensive rural population: the government's only hope is to enlist their aid, rather than to fly in the face of their wishes. The first step in this process is to accept that the proceeds from wildlife utilisation must go to the rural village, not into central government coffers. The next is to devise programmes for the rational use of wildlife by the rural community where government's main role is as an advisor. There is too much talk about wildlife utilisation for the benefit of the people, where what is intended is that government will continue to manage, harvest and market the products and will make payments to rural dwellers to keep them happy. This is not constructive in the long term. Only when communities take over the management of their own wildlife will the benefits begin to show.

Apart from Zaire, there are many countries which do not have enough manpower, funds and equipment to do the job demanded of them by their own governments and the world conservation community. If they continue to struggle with their present policies there is little chance of things improving. The answer may lie in accepting that illegal hunting is inevitable, and look for for ways to bring it within manageable bounds. The long term aim of conservation is simply to ensure survival of the species, and if this has to be achieved by methods which destroy some of the illusions about conservation, that is neither here nor there. In Zaire a proposal was discussed for legalising poaching which is presented in Appendix 14. The ideas have application in any country where the present conservation policies are becoming more and more difficult to enforce.

INDIVIDUAL COUNTRIES

Countries are listed in the order in which I visited them.

Botswana

The human population of Botswana is slightly in excess of one million persons living in 600 373 sq km. As such it qualifies as one of the least densely populated countries in Africa.

Botswana used to run an annual lottery for elephant hunting licences which allowed residents and citizens the opportunity to hunt. The system ensured that all people had an equal chance of a licence, and perhaps the only flaw in it was that the large safari operators negotiated their quotas separately. The country banned elephant hunting in 1983, following various malpractices by hunters. The feeling of the authorities is that the ban has proved beneficial because it has eliminated such offences as lack of follow-up of wounded animals, "double-shooting" (if the first elephant shot did not have large enough tusks, a second was often taken illegally), and unauthorised entries and exits from hunting areas. The Department has been unable to man checkpoints at the entrances to all hunting areas due to staff shortages (the total staff for the country is about 350 persons).

At present the sole sources of ivory are from confiscations, deaths of wounded animals and rare instances of control hunting. Typically the country exports about 2 tonnes per year, which are sold by tender. Tusks are marked in accordance with the CITES procedures, and there are 5 registered signatories at Francistown, Maun, Kasane, Gaborone, and Machaneng.

The country permits private dealers and carving industries to operate, and allows the import of raw ivory from other countries to provide the necessary ivory for the local industry. All ivory dealers keep detailed registers of tusks acquired and disposed of. I was not able to establish from the authorities whether Botswana permitted the re-export of raw ivory by private dealers. Their feeling was that if this was occurring it was not in the spirit of the dealers' original request to allow imports only for the purpose of internal consumption.

Botswana supported the idea of an ivory export cartel very strongly. The country is totally familiar with the system for selling diamonds and the penalties for unauthorised possession, as it is a major producer in this field. The Director felt that if the status of ivory could be raised to the same standing as that for diamonds it would enhance conservation. At present the fines for illegal hunting in the country are trivial (about 200 pula) and this does little to deter poachers.

Zambia

The country has a population of about 6.5 million people in an area of 752 610 sq km and is therefore relatively unpopulated. It has extensive ranges for elephant, including 61 000 sq km under National Parks and 159 000 sq km in Game Management Areas. Despite this (or because of it) the elephant population is declining sharply. There are insufficient staff to effectively man the vast wildlife estate.

Zambia banned elephant hunting in 1982, but the general feeling of the Departmental staff is that this was a retrogressive move. The lack of a presence provided by the safari operators may have intensified illegal hunting. In June 1984 the Government withdrew all permits for private dealers in ivory and carving industries. The Government is now the sole owner of ivory, and has set up a Revolving Fund to accept all proceeds from ivory sales. A significant proportion of this revenue goes to benefit the Department. A carving industry has been established under the fund which handles about 2 tonnes of ivory per year. At present the greatest problem facing the industry is the marketing of its products.

The largest source of ivory is from confiscations (some 2 500 tusks per year) but this is probably only a small part of the illegal traffic. Zambian ivory provides as much of 75% of confiscations in Malawi. This is clearly unsatisfactory from the Zambian authorities' point of view: it is some recompense to capture a part of the illegal haul, but nowhere near as satisfactory as to prevent the hunting in the first place. There is a large surplus of ivory in Chilanga at present (some 12 tonnes) which is due to be exported soon. Zambia marks all its tusks in accordance with CITES procedures. Raw ivory is sold by tender at prices which are well below the true market price.

There are enlightened developments afoot in the Luangwa Valley to introduce new community schemes where the residents can benefit directly from wildlife utilisation, and these provide the best hope for the future. The Lupande Development Scheme (Dalal-Clayton and Lewis, 1984) is a well-considered project at a grass-roots level which should work. A major regional plan for the Luangwa Valley is also being discussed, but my personal view is that this is unnecessary and should not be allowed to prejudice the community projects which are far more urgent. Experience in Zimbabwe with regional plans (Martin and Taylor, 1983; Martin, 1982) has led me to believe that whilst they may be useful exercises, they seldom lead to any constructive development.

Malawi

The country is relatively small (118 484 sq km) and densely populated (7 million people). Unlike Zimbabwe, there are no vast tracts of unclaimed land and the country relies primarily on its rural agriculture for survival. Despite land pressure the Parks and Wildlife Estate is well conserved and boundaries are respected by rural residents. In areas of potential conflict electric fences are used to prevent animals from raiding crops. A large part of Malawi's success stems from well-trained staff, comprehensive master plans for conservation (Bell and Clarke, 1985), and a sophisticated level of anti-poaching work (Bell, 1984; Bell, 1985b).

The majority of ivory in Malawi, like Zambia, originates from confiscations - the difference being that most of Malawi's confiscated tusks come from Zambia. It is worth discussing the mechanisms involved here because they are a feature of the ivory trade that no international sanctions can address. A tusk may originate from as far afield as Zaire, be used as barter for essential foodstuffs on the border with Zambia, and then move in small steps across Zambia in a series of transactions which may not involve money changing hands. The tusk is too "hot" to hold for long, and it is important for the owner to get rid of it before being caught in possession. When, finally, an unfortunate individual is caught with it after many exchanges, the tusk becomes legal government property. But this is not before it has performed a valuable role as currency for a rural trade system extending across international boundaries and independent of modern import/export restrictions.

Confiscations account for about 75% of Malawian ivory, and the balance is largely provided by control hunting. Malawi has a system in operation which I did not encounter elsewhere in Africa. The revenue from ivory sales goes to support the Department's budget and the staff have strong incentives to shoot large tusked animals on control, and to execute anti-poaching operations with vigour. The size of tusks shot on control recorded in the Kasungu National Park ivory register would have been very suitable for sport hunting trophies in many other countries! The wildlife staff are well aware of the irony in their situation: if they are totally successful in eliminating poaching, and if electric fences prevent further crop raiding, they will find themselves materially worse off.

Almost all ivory obtained in Malawi is consumed in the domestic carving industry. The Chief Parks and Wildlife Officer was far from satisfied with this state of affairs because the carving trade provides an outlet for illegal ivory which is difficult to control. However, the carving industry in Malawi is well policed and all worked products can theoretically be related to the registered tusk from which they originate.

Malawi would export in the case of a major confiscation which exceeded the needs of the internal industry, and felt that provision should be made under the quota system for contingencies such as this. Malawi is not using metal punches to mark tusks at present because they are not exporting. Ivory is sold by tender or fixed government price, and this is well below the current international price.

On the quota system, the view was expressed that African countries are in the best position to judge what will be produced in their countries, and the western hemisphere should not sit in judgement on the final quotas. Strong measures to control wildlife utilisation within the CITES forum may act against conservation in Party states, and the example of the Nile crocodile was discussed. On the subject of a minimum size of tusk for export, Malawi felt that this was not of much consequence as most of the ivory they were recovering through confiscation was relatively large, and the establishment of such a limit would not influence illegal hunting in their country. It was felt that a standardised form for quota submission was desirable.

Tanzania

The area of the country is 945 166 sq km and the current population is about 20 million people increasing at a rate of some 3% per annum. At a density of about 20 people per sq km it is relatively underpopulated (Malawi has about 60/sq km), and there are large uninhabited areas such as the Selous Game Reserve in the south-east of the country which at 55 000 sq km is the largest in Africa. Some 24% of the country is devoted to National Parks, Game Reserves and Controlled Areas (which include human settlement).

The largest source of ivory in the country is from control hunting. Douglas-Hamilton and Davitz (1978) calculated the proportion at 73% for 1967-68, and in a sample from the ivory register in Arusha from 1981-84 I found the proportion was 67%. From the same register the proportion of confiscated ivory was 27%, which is very much higher than the 1% found by the above authors from the 1968 data, and may indicate a substantial increase in illegal hunting. It is interesting to note how very different the proportions are from neighbouring Zambia and Malawi where confiscated ivory forms the overwhelming proportion of the total. The bulk of Tanzanian ivory comes from the south-east of the country (Selous).

The flow of ivory within Tanzania is fairly complicated. Douglas-Hamilton and Davitz (1978) give a diagram of the possible routes taken by ivory inside the country, but I found that this did not pertain to the situation in 1984 - if anything it is now more complicated. Under the Wildlife Division at Ministerial level are three main branches: Tanzania National Parks and TAWICO (Tanzanian Wildlife Corporation) which are parastatal, and the Wildlife Division itself. Each of these three bodies deals with ivory, although TAWICO is the main handler of exports. The Ivory Room in Dar es Salaam receives the bulk of tusks, particularly the large ones, from all regions of the country. Within the regions smaller tusks may be sold out of hand to local carving industries; hunting trophies may be exported directly; National Parks may export its own ivory, and TAWICO is permitted to receive tusks directly from within the region providing it notifies the Director. The Ivory Room sells 20 kg per month to each of 32 carving industries in the vicinity of Dar es Salaam amounting to about 7.5 tonnes. These tusks may not be exported. TAWICO buys from the Ivory Room and arranges exports directly from Dar es Salaam. I found it difficult to reconcile the total export figures from Tanzania with the annual stocks in the Ivory Room, but was assured that this was because all tusks are not always exported in their year of entry to the Ivory Room and TAWICO gets ivory from other sources. If I may be permitted a recommendation, it would be that the present system should be simplified!

There is a very great difference between the typical number of tusks received by the Ivory Room from 1971-77 (Douglas-Hamilton and Davitz, op. cit.), and the numbers between 1982-84. The lowest figure in the earlier data was 3967 tusks in 1971, and in all the rest of these years it was of the order of 6000 tusks weighing about 30 tonnes. In 1982 it was 1480 tusks weighing 7.7 tonnes; 1983 - 1696 tusks weighing 9.6 tonnes, and in 1984 (excluding the last 2 weeks of December) - 1301 tusks weighing 5.9 tonnes. I am at a loss for an explanation for the sudden drop in numbers. What is more difficult to understand is that if the amount sold to local carvers from the Ivory Room is about 7.5 tonnes annually then there is virtually no surplus for export in any of the recent figures. Tanzania exported 9.4 tonnes in 1982 and 4.6 tonnes in 1983, so TAWICO must have obtained almost all this ivory from elsewhere in the country.

Tanzania does not permit any ivory imports and private dealers are not allowed to export. Safari hunting was banned between 1974 and 1978 but is now in operation again with about 100 licences per year being issued. Tusks are marked according to the CITES procedures and the Director of the Wildlife Division is the only signatory for export permits. Ivory is sold by tender and the prices realised are very much lower than the reigning international prices. Tanzania would not be opposed to a minimum size of tusk for export, as it tends to export only tusks greater than 10 kg from the Ivory Room.

The Government pays rewards for found ivory and information leading to conviction of poachers. However, almost all found ivory is turned in by staff of the Wildlife Division, indicating that the rewards are not high enough to attract private citizens who would rather sell to the illegal buyer.

Illegal hunting is becoming a major problem. In the opinion of the Director of TAWICO very little is finding its way to the coast, but is disappearing through Burundi. All officials to whom I spoke were convinced that Burundi is the major exit point for large amounts of ivory from Kenya, Tanzania, Zambia and Zaire.

My overall impression was that conservation in Tanzania was of a fairly high standard, particularly when the low salaries and limited number of staff to

police such a vast wildlife estate are taken into account. However, the threat of increased illegal hunting is present, and if events suddenly took a turn for the worse the existing staff would be hard pressed to contain any major outbreak of poaching. I feel there is a strong need for the introduction of programmes to allow rural communities to take over the management of wildlife resource outside National Parks, even if this involves changes in the existing legislation. I was informed that in the vicinity of Ruaha National Park the local population was co-operating extensively with poachers and was totally alienated from government staff. The best solution to problems such as this probably lies in abandoning attempts to claim a government monopoly on all wildlife, and rather searching for ways to induce communities to take over the responsibility, giving them all the technical assistance necessary and allowing them to reap the benefits without undue bureaucratic control (Martin, 1983; Martin, 1985). Perhaps the present high level of control hunting by government staff could be replaced by well regulated community cropping schemes, where the ivory and all other wildlife products would belong to the community rather than the Government, and would thus be used by the rural people legitimately.

Kenya

With an area of 582 647 sq km and a population of 20 million Kenya may not appear to be overpopulated. However, a large part of the country is extremely arid and the population is highly unevenly distributed being concentrated on the better soils in the southern third of the country.

The Kenya elephant population has been declining steadily since 1977 (Stelfox et al., 1984), but this may be inevitable with the very high rate of human increase and demand for arable land in the country. Kenya is unique among African countries in having effectively "banished" everything to do with the ivory trade in the country: there are no dealers, carvers or retailers of ivory products. The country does not allow the import of ivory, but permits transit if all documentation is in order. What little ivory accumulates through control hunting, natural mortalities and confiscations is channelled through Nairobi and exported by the Government. This is sold by tender, because the Kenya authorities feel there would be collusion amongst buyers on an auction. However, the prices realised for ivory are very low (US $40/kg). Kenya uses felt-tip pens rather than metal punches to mark its tusks, and uses the registration NRB (Nairobi) rather than a national code.

Kenya would be opposed to any minimum size of tusk for export because it has no internal use for ivory and all tusks must be exported. The opinion was expressed strongly that Kenya would not be prepared to tolerate undue interference from non-producer countries in the matter of setting quotas, and that demands from the European Economic Community for management plans from ivory exporting countries were unrealistic. The Kenya authorities feel confident in setting their own export quotas, and did not feel it was necessary to test the method outlined in this report.

Kenya enjoys what is probably the largest tourist market for wildlife in Africa, and this determines their policies towards conservation. Wildlife utilisation schemes rank very low in their list of priorities, and are probably impractical in view of the high densities of humans surrounding many National Parks. Their needs are for efficient protection of the resource within gazetted areas, although there is the additional problem of wildlife populations with migratory habits which move outside National Parks. It is here that they may have to consider some practical accommodations with rural human populations on boundaries.

Traditionally Kenya has always been an attraction for a wide spectrum of international wildlife scientists and conservation experts. Nairobi hosts numerous non-governmental organisations apart from well-known individual conservationists. I found it a somewhat alien experience to be in a country where there are so many additional spokesmen on wildlife matters over and above the official government agency, and learnt that that this frequently leads to embarrassment of the authorities. Such a state of affairs cannot aid conservation, and it would be desirable to see closer co-operation between the Government and private sectors, with the initiative coming primarily from the outsiders.

A feature of the next four countries, Somalia, Ethiopia, Sudan and Chad, is that they are all fighting wars to a lesser or greater extent - either with their neighbours or with dissenting factions within their countries. Such military activity drains the country of wealth, and there is very little funding available for conservation. Wildlife legislation has little impact in such circumstances. I found it remarkable that there were still active government agencies trying to implement conservation rules despite the daunting setbacks.

Somalia

With only 4-5 million people in an area of 637 664 sq km, Somalia might appear underpopulated: however the northern half of the country is mainly desert and humans are concentrated largely in the south where the potential for conflict with elephant is very high (Watson, 1984). Even in the south rainfall is low (400 - 600 mm), and there is extensive overstocking of domestic livestock which is in direct competition with wildlife.

The Somalian Parliament has ratified the CITES agreement and there remain only bureaucratic problems in obtaining accession. The National Range Agency which is responsible for wildlife is without any specific field staff, and relies on the police who have a task force designated to carry out anti-poaching work. Their job is daunting as Somali hunters are know to be among the most proficient and ubiquitous in Africa.

Somalia banned all hunting in 1971, and has since closed down the ivory carving industry and revoked all dealers' licences. The Agency has opened a small experimental laboratory to teach the art of carving, and to reconstruct the industry in government hands. This is unlikely to use more than a tonne of ivory annually. The Government has a surplus of 40 tonnes of confiscated ivory which it plans to export in the near future, and thereafter it does not envisage a sustained output. Somalia would readily adopt the standard tusk marking system of CITES on accession.

Illegal hunting has been intense in Somalia recently (from officials, and Watson, 1984) and the Government has mounted a major publicity campaign to combat the problem. Notwithstanding the 40 tonne stock held at present, the authorities believe there are large caches of ivory still buried throughout the country. Such ivory is being gradually recovered by using a system of payment for information (20% of the value of the captured amount) which appears to bring in at least one tonne per year. Poachers are severely punished with prison terms of up to 15 years.

In the majority of Africa it is believed that very little ivory leaves the continent illegally (Parker and Bradley Martin, 1982). Somalia may be one exception to this. The country has an extensive coastline which is very difficult to police, and the sailing distance to countries in the middle east is not great. I heard the opinion expressed in several quarters that significant amounts of illegal ivory were moving to India and Pakistan in small dhows. Djibouti also buys illegal ivory from Kenya and Somalia and, being a free port, there are no difficulties in exporting further afield. The quota system may address this problem if consumer countries co-operate.

Somalia has been asking for assistance in conservation for many years, both to establish an efficient field staff and to re-structure their central wildlife organisation from the head office downwards. The authorities made several points to me fairly forcibly which I feel bound to repeat here. At the time of acquiring independence, they were left with a total absence of conservation legislation, policy and infrastructure. Their requests to the outside world at a time when they had 25 - 30 000 elephant produced little other than questionnaires and frivolous enquiries. Because their budgets were low, potential donors felt that the country had no commitment to conservation and was therefore not worth helping. International trade resolutions and "lightning" visits from consultants (reference my visit) have done nothing for them either, and they are highly sceptical of the international conservation effort - perhaps justifiably.

During my stay in Somalia I heard nothing but favourable opinions of the National Range Agency, both from other government officials and private individuals.

Ethiopia

Ethiopia has on of the highest populations in Africa, some 40 million people, and although it has an area of 1 237 000 sq km, less than half of this has much potential for human settlement. A major human crisis has been caused by the recent drought in the country, and it seemed somewhat trivial to be discussing wildlife issues with the greater problems on hand.

Ethiopia is not yet a CITES signatory but is anxious to abide by the CITES regulations. However, certain restrictions, particularly those regarding leopard, strike them as inappropriate. They approved of the proposed quota system for ivory and felt that each country should set its own quota. They favoured international involvement in conservation issues as a way of putting internal pressures on governments to recognise their own natural resources.

The Wildlife Conservation Organisation is a Department under the Natural Resources Branch of the Ministry of Agriculture. It is divided into two main sections: the Division of National Parks, and the Division of Wildlife Utilisation and Anti-Poaching. There is also a separate Administrative section. The Wildlife Utilisation Division (with whom I dealt) handle a diverse set of industries, including civet musk and baboons and monkeys which are exported.

All ivory flow is centralised through the ivory store in Addis Ababa, but tusks are not registered in field stations and are unmarked until they reach Addis. The main source of ivory is from confiscations; there is very little control hunting, and about a dozen elephant are shot on sport hunting licences annually. The confiscated ivory is larger than in most countries (40% of tusks greater than 5 kg and the largest pair 48 kg each), and this was one of the

few stores in which there was a significant proportion of found ivory. Many of the larger tusks were cut in half for ease of transport by the illegal owners. Typically about 1.5 tonnes of ivory (200 tusks) are confiscated annually.

There were no official ivory exports in 1983 and 1984. At the time of writing the Government has about 5 tonnes in stock, and private dealers, of which there are seven in Addis Ababa and a similar number in Asmara, were holding about 4 tonnes. Very little of this ivory is exported and it is used mainly in the domestic carving industry. The carving industries have a quota of ivory from Government and when this is exhausted they are allowed further purchases. Private citizens are holding about 5 tonnes of ivory with certificates of ownership.

Ivory imports are permitted under strictly controlled situations for the carving industry, but there has in fact been only one case of import in the last 5 years. All worked ivory is subject to export permits and the recorded amounts were slightly under 400 kg in 1983 and in 1984. Ivory is sold by tender or by fixed government price for out-of-hand sales.

The Ethiopian authorities are reluctant to see ivory become a major issue in their country. It is not in line with their conservation and management policies to exploit elephant populations actively, and they have numerous other wildlife utilisation schemes in which they are more interested. The status of conservation in the country is relatively high, and there are not large tracts of unused land containing elephant: almost the entire population is in protected areas. Tourism is actively promoted, including sport hunting. In many respects Ethiopia and Malawi are similar: both have mature conservation policies which seem to be a product of a situation where human populations have reached a particular level and there is little land left for further expansion.

Sudan

The Sudan is the largest country in Africa (2 505 810 sq km) with a population of 20 million people. Unlike Zaire, which is almost as large, one third of the Sudan is desert. Elephant occur in the south of the country only and in recent times numbers exceeded 76 000 (Watson et al., 1976). Owing to the war in southern Sudan there are no recent figures for the population, but large ivory exports in the last four years would suggest that it has greatly been reduced.

Following the exports of 1981 and 1982 (and an attendant amount of world publicity) Sudan banned all exports in December 1983. However, immediately following the ban certain influential merchants protested strongly to the highest authorities and, on the threat of legal action, the wildlife authorities were forced to back down. Some 3-4 merchants obtained permission to fulfil outstanding contracts for export orders. I am not sure at the time of writing whether these contracts have been fulfilled. The contracts were for extremely large amounts of the order of 10 to 40 tonnes per merchant (although I saw the exact figures in a file at the Ministry of Commerce, I was not permitted to copy them). The Director of Export Promotion informed me that the amount outstanding was 13.7 tonnes, but the Director of Wildlife thought that the figure was more like 22 tonnes.

This brings up an extremely important point regarding internal administration. It appears that Sudan merchants have in the past solicited orders for ivory from importing countries without actually having the stock on hand. On receipt of the order and import permit from the prospective importer the merchant

would set about collecting the necessary tusks and produce the documents as grounds for the granting of an export permit. Few systems could be more open to abuse.

Most government ivory stocks originate from confiscations. There are some 7 tonnes in stock in Khartoum at present, and a similar amount in Juba. More confiscations are expected in southern Sudan in the near future. Control hunting accounts for about 100 tusks per annum. The authorities will set a quota of some 30 tonnes to clear present stocks, and expect in the future to have a low production which will be mainly consumed internally. In the event of a large confiscated amount they will use a special quota to cover the export.

Sudan does not allow ivory imports, but will permit transit if documents are in order. The Government is unwilling to reopen the door to private ivory traders when the quota system comes into effect.

Government ivory is sold by tender as local merchants conspire to keep prices low in auctions. Sudan would not favour a minimum size of tusk for export as they frequently acquire small tusks and pieces of ivory in the confiscated lots. It is illegal in Sudan to sell tusks of less than 5 kg.

It appears that the Sudan authorities may have been unfairly criticised by the international community for the recent large amounts exported: much of this was illegal ivory bearing Sudan certificates of origin. Caldwell (1984) shows that Hong Kong imported 214 tonnes from Sudan in 1981, and 219 tonnes in 1982. The official statistics within the Ministry of Commerce show the total exports of raw ivory from Sudan as being 19.6 and 57.2 tonnes for the same two years. Of these total exports there were none to Hong Kong in 1981 and only 4.9 tonnes in 1982. In 1981 Belgium imported 6.7 tonnes, India 4.3 tonnes, the Arab Gulf states 4.1 tonnes and Spain 3 tonnes. In 1982 the bulk of exports went to Belgium (36 tonnes), the German Federal Republic (12 tonnes) and Hong Kong as stated. I heard the same explanation for the large discrepancy from two independent sources: large amounts of illegal ivory, including some from Zaire, Chad and C.A.R., had been exported from free ports across the Red Sea bearing forged certificates of origin from Sudan.

The Director of Wildlife Conservation felt very strongly that shipments from free ports should not be accepted by consumer countries because they are almost invariably illegal stock. Recently the Sudanese Government has banned all shipping across the Red Sea by small vessels in an attempt to curb illegal exports. Dr. El Rayah Hasaballa also felt that all major shipments arriving at ports such as Hong Kong and Tokyo should be referred back to the originating countries for confirmation of the validity of export documents (he gave an example of one legal permit issued by the Sudanese authorities for 2 tonnes of ivory which had been skillfully altered to read 62 tonnes). Indeed, copies of all import permits issued by importing countries should automatically be posted to the CITES Management Authority of the exporting country concerned. All Dr. El Rayah's suggestions are included in the first section of this chapter.
[Note: since the 5th CITES meeting in Buenos Aires these recommendations have been incorporated into the ivory trade procedures.]

I had the opportunity to talk with one of the largest ivory merchants in Sudan and hear his views on the subject. The family concerned had been in the ivory trade since the previous century and the grandfather of the present head of house had been involved in slave trade, using slaves as porters for ivory. It was clear that the gentleman concerned was in charge of a major financial

empire, and he frequently checked his telex machine during the course of our discussions. His expertise in ivory was obvious: he identified for me the many different types of tusks in the trade which all have characteristic names, and spoke with considerable authority.

He was vehement on the matter of illegal trade and thoroughly agreed with the recent ban on exports, which he felt had greatly curbed the flow of ivory. As a legitimate trader he resented strongly the fact that the illegal competition was evading the taxes due to Government and selling at prices below the true market value (the Sudanese Government charges a 35% export duty on ivory and a surcharge of one Sudanese pound for every pound of ivory, and legal shipments also require veterinary certificates and CITES permits). He also had confirmed examples of corrupt customs officials in importing countries who allowed documents for shipments of as little as 5 tonnes to cover amounts as great as 40 tonnes. In some cases photocopies of expired permits were being used and in others several shipments were being allowed to enter on a single permit with a six-month validity. He thought that the 1983 exports from Sudan amounted to some 75 tonnes of legal ivory and 400 tonnes which was illegal, with the main staging point for the latter being Jeddah in Saudi Arabia.

In his view the Sudan elephant population was still high but had lost all large tuskers - he recalled wistfully the days when he had dealt in tusks as large as 150 lb. He was opposed to the trade being reopened to all and sundry, and felt that when the quota system was introduced the Government should parcel it out to established reputable traders on the basis of past foreign currency earnings, and exclude Johnny-come-latelys (This argument sounds remarkably similar to one which I hear frequently from safari operators in Zimbabwe!). He felt that an appropriate quota would be about 60 tonnes. Finally, he made the very important point that international trade regulations could do nothing to save the elephant in the Sudan: the only thing that would do so would be improved internal administration and policing.

A major initiative is being taken by the Governments in Sudan, C.A.R., Gabon, Cameroon and the Congo to prevent the export of each other's ivory and to combat poaching. Zaire, Chad and Uganda are also expected to participate in the near future. The Ministerial Conference of the Central African States for the Wildlife Conservation (MCCASWC) has established a fund for operations and a Secretary, who will be resident in Sudan, has begun collecting subscriptions. The organisation intends establishing highly mobile anti-poaching units who have the right to cross borders ("hot-pursuit") in the course of apprehending poachers. The revenues from confiscations will be repatriated to the countries of origin.

Chad

Although Chad is large (1 284 000 sq km) the northern third of the country is true Sahara desert, and the middle third is arid Sahelian zone. The desert is moving southwards at an appreciable rate: it appears that a long term climatic change towards increased aridity is affecting the country. The human population is some 5 million. The recent war has left Chad destitute and the country is struggling to repair war damage and resurrect its economy. As in Sudan and Ethiopia, there is a major human crisis caused by the drought. Indeed, wildlife issues are a minor problem in Chad at the moment.

Chad is not a member of CITES, but is anxious to become one. I found that whilst they had heard of the Washington Convention, CITES was almost an unknown quantity to them. They felt that much as they would like to join, the

participation fees would be impossible to raise in the country's present circumstances.

The administration of wildlife in Chad falls under the control of the Ministère du tourisme, des eaux et forêts. There are some 400 people working in Parks and Reserves, and 600 in forestry. Many of these were not paid at all during the war years, and it is only recently that salary payments are returning to normal. There are two National Parks in the country (parc national de Zakouma (300 sq km) and parc national de Manda (1140 sq km)), and 7 Game Reserves, 5 of which contain elephant (Mandelia (1380 sq km), Bahr Salamat (20 600 sq km), Siniaka-Minia (4260 sq km), l'Abou Terfan (1100 sq km) and Binder Here (1350 sq km)). The remaining two reserves are Fada Archai (2110 sq km) and Ouadi Rimé/Ouadi Achim (80 000 sq km).

During my stay in the country I was fortunate to have two meetings with the Minister who briefed me on many of the current problems of the country. He was anxious to make it clear that if ivory is leaving Chad illegally, it is totally against the wishes of the Government, who are working towards restoring elephant populations and wish to use the resource wisely.

The administrative and technical staff of the Department were of a very high calibre with a strong commitment to conservation. Every moment of the 5 days in Chad was spent in working sessions, and the staff gave no thought to office hours or weekends. We frequently worked late into the evenings, and I found myself "sucked dry" by the end of the day! The results of every session were reported to the Minister, and in our final meeting I found that he was totally briefed on all aspects of the material we had covered. I was told that I was the first person from the international conservation scene to visit Chad for many years, and it appeared that the staff had been waiting for any available ear to listen to their problems.

There is no doubt that the war had a devastating effect on the elephant in the country. I was given descriptions of large military trucks loaded with ivory destined for the Libyan Arab Jamahiriya, and of a full scale slaughter using military weapons which was reminiscent of events in Uganda in the previous decade. The bitterness towards their northern neighbour was considerable: not only does the Libyan Arab Jamahiriya still occupy a large part of Chad, but it also occupies the richest area with oil and minerals. In the chaos that prevailed during the war many poachers from other nations such as C.A.R., Kenya, Sudan and Eritrea took advantage of the situation. Recently 161 tusks of Chad origin were confiscated in Nigeria. Chad has now signed an agreement with C.A.R. to restore organised customs systems and to control illegal hunting using paramilitary troops.

Before the outbreak of war in 1979 Chad ran an organised system of hunting by foreign tourists and residents, and all tusks were registered and stamped with the permit number, a letter code designating whether it was left or right tusk, the year, and the weight. This system collapsed after 1979, and ivory was being licensed and granted export permits by any petty official in any district of the country. The authorities are now struggling to restore the earlier system, but hunting by the military is still a problem. During the war the Chief of the Division of Fauna was imprisoned for attempting to prevent elephant hunting, and the Director-General was forced to sign export documents with a pistol pointed at this head. The Minister is now insisting on a single person in N'Djamena as the only authorised signatory for permits and export certificates.

Government ivory in Chad used to be sold through a parastatal called Domaines, and sales were either by auction or at a fixed government price for small amounts. Small amounts were also sold to carvers in the districts from the Prefecture offices, but the carving industry in Chad is not large. Most ivory originated from confiscations, with perhaps 10 elephant being shot annually on control hunting. Possession of any tusks under 5 kg is totally forbidden, and such tusks when seized by Government are not exported but used locally. Illegal possession of tusks over 5 kg is punishable by heavy fines and imprisonment with hard labour. There is no reward system for handing in found ivory. Imports of raw tusks are not permitted. Chad will consider allowing private dealers to operate again once they have drawn up new rules for the ivory trade. Official exports in 1983 were 1723 tusks weighing 10.6 tonnes, and in 1984 there were 498 tusks weighing 3.7 tonnes. Imports recorded in Hong Kong were 29 tonnes and 31 tonnes for the same two years (Caldwell, 1984). A large proportion of these exports was clearly illegal. The price for ivory is astonishingly low - about US $7/kg.

The authorities in Chad regard one of their biggest problems as being the large amount of illegal ivory still remaining throughout the country in hidden caches. They were considering an amnesty such as that declared in Sudan in 1973 (Parker, 1979), allowing people to bring tusks in and register them legally on payment of a government tax. We discussed this at length, and came up with an alternative scheme which, instead of legalising the tusks, involved Government purchasing the tusks at a price which was considerably higher than that which the present holders were used to getting from illegal dealers. The value of ivory in Chad is so low that the authorities felt that a price of the order of US $20/kg would be absolutely certain to secure any outstanding ivory. This could then be sold at the prevailing international trade price with a part of the profits going to the Treasury and the rest being used to re-establish the Wildlife Department. This proposal is being followed up at present.

Central African Republic

The area of the country is 622 984 sq km and the population is some 2 500 000 people, making C.A.R. one of the least densely settled areas in Africa. This may be the result of the slave trade which persisted as recently as 1939, and the conscription system implemented by the French for the rubber plantations. At present there is a net urban drift of people further depleting the rural areas. The entire eastern third of the country is virtually unsettled (Vakaga, Haut Kotto, Haut Mbomou, and Mbomou provinces), and is prime elephant habitat (forest savanna). No surveys have been carried out since the work of Spinage (1978) who estimated the elephant population at 70 000 $\pm$ 10 000.

[Note: a survey has recently been completed by Douglas-Hamilton (June 1985) which indicates a major decline.]

The exploitation of elephant in C.A.R. is comprehensively covered by Froment (1985), whose report is a chronicle of perhaps the worst administrative system, the most inept financial management and the least effective elephant conservation methods in Africa. The Bokassa regime can be blamed for a large part, but the situation is still deplorable. I will bring out only the major points from Froment's report.

The large numbers of elephant killed during Bokassa's reign led the new Government in 1979 to ban all hunting. This served only to promote illegal exports through Cameroon, Chad and the Congo. The loss to the state of these

illegal exports caused them to resume the commerce in ivory at the end of 1981, and hunting was reopened in 1982. A quota of 200 elephant was provided for hunting: the country exported 22 000 legal tusks in 1982 - 83. The vast majority (91%) of these were represented as coming from neighbouring countries, but in fact the majority were from C.A.R. Dealers acquired false certificates of origin, mainly in Zaire, and then "imported" their own ivory into C.A.R. on payment of a nominal tax.

The ivory trade in C.A.R. is run by a highly efficient network of illegal hunters, field buyers and large dealers. It is probably the only country left in Africa which still allows the practice of "collection". Before the days of sophisticated weapons a collector was given a permit to buy found ivory from villagers. Now the collector drives a large truck with a container and dispenses weapons to rural dwellers, who pay for them with ivory (the collector is now finding that a Toyota Land Cruiser suffices - there is very little ivory left to collect). The tusks obtained by the collector are not marked, registered or at any time handled by the wildlife authorities, from the point of acquisition in the field to the moment of export. No laws are being broken. The authorities feel that they are left with Hobson's choice: if they stop the practice of collection it will merely promote an illegal traffic through other countries; either way, the elephant will be eradicated.

Apart from a small effort in the Manuou Gounda St. Floris National Park, there is virtually no effective anti-poaching work.

Froment estimates that, over and above exports, some 15 - 30 tonnes of raw ivory are used in the internal carving industry, all of which is illegal. C.A.R. exports most of this worked ivory to West Africa, and despite an extremely low export tax, the majority leaves the country illegally. The Government earns some US $3000 on such exports. The country has a restriction forbidding the export of tusks under 10 kg. Recently large numbers of polished tusks under this weight limit have been exported under the heading "works of art" to Hong Kong.

Froment recommends that:

a) All ivory dealing should be banned, particularly the practice of collecting.

b) All ivory imports should be prohibited.

c) Raw ivory exports should be prohibited, and all ivory acquired should be used to sustain the internal carving industry.

d) All elephant hunting should be suspended for a period of two years, during which time the authorities would deal with the illegal hunting. Elephant hunting should be reopened with area-specific quotas rigidly enforced by the authorities.

e) Government should become the sole source of supply for ivory and should conduct all sales.

f) All artisans carving ivory should be registered and should submit regular returns to Government of all stocks of raw ivory which they hold, indicating the numbers marked on the tusks by Government.

g) Government should enforce all the provisions of its latest Wildlife Ordinance 84.045 of 27 July, 1984, which provides protective measures for wildlife and rules for the control of hunting.

h) All tusks should be marked and registered by Government.

i) Government should reinstate a system of rewards for civil servants who are responsible for the apprehension of poachers and whose actions result in the seizure of illicit ivory.

j) The work of civil servants should be regularly inspected both in field stations and headquarters to promote a high level of efficiency and to control corruption.

k) The field staff complement should be increased. At present there is only one forest guard per 2 600 sq km.

l) The working budget of the High Commission for Tourism, Water, Forests, Hunting and Fishing should be increased. At present this budget is about US $22,000, yet the High Commission is responsible for generating some US $12 million annually.

m) The National Centre for the Protection and Management of Wildlife (CNPAF) should be allocated funds for anti-poaching work. At present it derives a large part of its revenue from taxes on ivory exports, which will clearly be lost when the preceding measures are implemented.

n) Anti-poaching activities in the National Parks should be expanded, and should include the training and equipping of teams, and the construction of bush roads to provide rapid access to remote areas.

o) Tourism should be promoted to generate revenue within the National Parks.

p) Further protected areas should be delineated in the dense forest regions, both to protect the vegetation and the forest elephants, gorillas, chimpanzees, giant forest hogs and bongos.

q) Government should insist on a conservation input from safari operators who have concessions in hunting areas. At present such operators are present on a seasonal basis only.

r) A census of elephant populations in C.A.R. should be undertaken by competent researchers. [This has been done]

s) There should be a study of wildlife utilisation as it is at present, leading to the formulation of future policies and strategies.

t) Data gathering systems should be established for recording essential statistics relating to the ivory trade, and for determining the contribution made by wildlife to the national economy.

u) A system of monthly and annual reporting should be established for the wildlife department, and for safari operators and artisans.

While I was in C.A.R. a very significant amount of international funding was made available to begin a project instigated by Froment which incorporated the above recommendations, and the Government intends issuing a new Ordinance embodying most of the points. [Recent advice from Douglas-Hamilton indicates that the recommendations have been implemented]

I support all of the above recommendations. If anything further should be added, perhaps it would be a long term move to integrate the internal carvers

with the hunting industry which provides their ivory and thus achieve a degree of interdependence between them. Government must open negotiations with the two groups and attempt to engender a responsibility on their parts towards the wildlife resource. Unlike the countries which follow in this section, C.A.R. is not necessarily a suitable area for the "legalised poaching" recommendation. The areas with elephant have a negligible human population and the illegal hunting is primarily carried out by people not normally resident in the area. The only solution is to stamp out this form of hunting through effective anti-poaching methods.

As mentioned under Chad and Sudan in this section, moves are under way to foster regional co-operation amongst the ivory producing countries in this part of Africa. Zaire has asked C.A.R. not to permit the import of any consignments of ivory unless accompanied by full CITES documentation issued in Kinshasa. A shipment worth US $4 million originating from C.A.R. was recently seized in the Congo. While I was in C.A.R. meetings were taking place with the Sudan authorities on anti-poaching.

In the view of the Haut Commissaire, Raymond Mbitikon, who is well respected and probably the main hope for conservation in C.A.R., the ivory trade has probably peaked out. Hunting and collection are likely to be stopped in the near future. Mbitikon views regional co-operation as a very important step in improving matters.

The authorities in C.A.R. were particularly interested in the IPEC proposals. They saw the solution to many of their internal marketing problems being solved by such a body, particularly if importing countries respect the organisation. They felt that IPEC could not only provide the most efficient marketing system, but like OPEC, its objectives should be to make the resource last a long time. They pointed out the existence of a similar organisation for the marketing of timber in central Africa.

The price of ivory is extremely low in C.A.R.: the poacher obtains no more than US $6 - 8 per kg, and government sales realise at best US $10 - 14 kg. My first reaction was that someone was making a killing somewhere - but it is not inside the country. I purchased worked ivory in the market place, which is the ultimate test of hidden profits by middle men, and found that bangles which should have been costing $100 were selling for $10. This pattern was to be repeated in most central African countries. It is very clear that they are being exploited by both worked and raw ivory importers in the world at large. Not only are they obtaining a trivial price for their ivory, but the remaining value of elephant carcases including the skin, meat and bones is not being realised at all.

C.A.R. has a government system of rewards for found ivory, but people find it more profitable to sell to the collector. Amounts of confiscated ivory within the districts are very low, and this is usually sold out of hand to local artisans in the area. C.A.R. has set a minimum tusk weight of 10 kg for export, although Government may export smaller tusks.

To sum up the situation in C.A.R.: whilst there is no doubt that a massive anti-poaching effort is needed (which is probably beyond the resources available in the country), such an effort will be wasted unless internal controls are improved. The present rules actually facilitate illegal hunting, and without a major overhaul of administrative procedures things are unlikely to improve.

Cameroon

Cameroon is 475 425 sq km in area with a population of 9 million people. The population density is highest in the West and Central provinces, while large parts of the country are totally uninhabited. Rainfall follows a gradient from about 500mm in the north near Lake Chad to about 2000 mm in the centre of the country and decreases to 1500 mm in the south. Rainfall in the western bulge is as high as 4000 mm. The Sudano-Zambesian savannas in the centre and north of the country are prime elephant habitat, and densities are frequently as high outside of protected areas as within. A feature of land planning is the presence of buffer zones around National Parks, and these are used as hunting areas (some 27 have been established). Drought is affecting the elephant population in Waza National Park in the north of the country, where there is both a water shortage and damage to the vegetation. The authorities feel that culling might be necessary.

I was privileged to meet the délégue général au Tourisme, Dr. Abdoulaye Souaibou, who informed me that Cameroon welcomes working with international organisations such as CITES and views wildlife as a valuable resource. Cameroon favoured the quota system and would do all in its power to make it work. Although they have not exported ivory for over two years and now use all their production internally, they would like to have an export quota to prevent certain people inside the country taking for granted the supply of ivory to the domestic carving industry. The quota system would also give them additional power within the country to resist demands for increased numbers of hunting licences. They were concerned that they did not have sufficient knowledge of their elephant numbers.

The Director of Wildlife and National Parks, Mr. David Momo, explained to me the structure of the administrative system in Cameroon. The wildlife division has a staff of some 600 people who cover 10 provinces.

Cameroon is fortunate in having a strict control on arms and ammunition and thus illegal hunting is not as high as in neighbouring countries. The collection of ivory (as described under C.A.R.) was banned in 1982 and there has been a sharp drop in poaching as a result. A network of paid informers helps to reduce illegal trade. Anyone in Cameroon may buy ivory provided it is accompanied by a certificate of ownership which is issued by the Department on payment of a tax. Illegal ivory cannot obtain such certificates. The number of elephant killed by poachers can be estimated as it is difficult to conceal the carcases and the authorities fairly soon learn of their whereabouts. The worst poaching is in the north of the country where Nigerians are the main culprits, although a large amount of the general poaching is primarily for meat. In the south poaching is entirely by Cameroonians for both ivory and meat.

Hunting is banned in the extreme north near Lake Chad, and about 100 - 200 elephant are taken on licence in the remainder of the country annually. The annual quota of big game licences is seldom fully used. These are taken by international sportsmen and residents who may sell the tusks to the carving industry, but generally prefer to keep them as trophies. Crop protection accounts for a small number of tusks. There is a minimum size limit of 5 kg for tusks taken by hunting, but this does not apply to exports.

Most ivory is sent to the capital, Yaounde, but the délégue général may authorise the sale of tusks to local artisans within the region where they have been confiscated. Government ivory is sold by Domaines in conjunction with the wildlife authorities, and such sales are generally by auction. I visited the ivory store in Yaounde and saw about 400 tusks. The average weight

was about 12 kg which is very high compared to C.A.R. or Chad. 95% of the tusks were from confiscations with the balance being found or shot on control. A few tusks which had been cut into pieces were confiscations from carving industries. There were some fine specimens of forest elephant tusks from the south-east of the country. I was told that there were about another 200 tusks in the government store in the Northern province. Cameroon is not yet marking its tusks in accordance with CITES procedures but plans to introduce the system soon. The price of ivory is low by international standards, although far higher than in countries such as Chad and C.A.R. - carvers pay about US $15/kg on the illegal market and the price on official sales seldom exceeds about US $30/kg.

A bureau has been established (1984) under the Ministry of Commerce and Industry to register all artisans in the country. Ivory carvers are among the most difficult to register as they avoid advertising their presence. The objective is to form a strong association of carvers and begin to study their ivory requirements so that the supply can be regulated legally by the Government. At present there is still a large illegal component in the carving trade, and I observed that when we visited a carving establishment several of the individuals ran away when they caught sight of the Chief of the Hunting Services in the vehicle. He explained to me that Service often raids these cottage industries and arrests people if any unlicensed tusks are found. I have frequently heard experts in the ivory trade say that it would be impossible to control these small carving industries in this part of Africa. I am not at all sure that this is the case. I have seen it done in Zimbabwe, and in Cameroon I saw clear evidence that the artisans had a healthy respect for the authorities, who are very successful in confiscating illegal tusks.

I visited the "Artisanat" in Yaounde which is a bazaar for the sale of worked ivory and other items of locally crafted jewellery and curios. It was here that I met the most persistent and aggressive salesmen in Africa. When I showed interest in a large ivory bangle which was over 100 years old the vendor followed me for three days all over the city, and finally to the airport in order to effect a sale! The Cameroon art forms are superior to most in Africa and many pieces are collectors' items. I feel strongly that a large amount of ivory going into local carving industries in Africa is totally wasted in the production of tasteless items which, while they may be sold, are an insult to the medium in which they are carved. Cameroon, through its attempts to control and limit the carving trade, and with its rich artistic heritage, may be one of the first countries to weed out the inferior products and the people producing them.

The standard of administration in Cameroon is relatively high and elephant populations appear secure. The biggest problem is the illegal traffic of tusks to the carving industry, which may use a tonnage as high as in C.A.R. The authorities are well aware of the problem and are taking measures to control it.

Gabon

The area of the country is 267 658 sq km with a population of under 2 million. Rural densities are declining as people migrate to the cities. Gabon has oil and is one of the richest countries in Africa on an income per capita basis. The country has a very high rainfall, the minimum being 1400 mm and the highest in excess of 3000 mm. Much of the country is covered with dense tropical forest which may not be optimum habitat for elephant. A study is about to be undertaken by Richard Barnes under the auspices of the New York

Zoological Society which may provide long-awaited information on typical elephant densities in these habitats.

A feature of Gabon that makes it different to other ivory producing countries is the presence of a significant market for worked ivory within the country. Some 35 000 French residents purchase large quantities of worked ivory annually which is exported regularly to France. There is no need for Gabon to concern itself with raw ivory exports; it is far better to work ivory and sell it in the country. Many of the neighbouring countries are equally alive to the Gabon market; worked ivory from Zaire, Cameroon, C.A.R. and the Congo finds its way to the Libreville market, and indeed many of the carvers in Gabon are nationals of other countries. Very little of the worked ivory enters the country legally and very few of the tusks carved in the country are legally acquired. I visited an emporium which was run from the private home of a Frenchwoman who had a reputation for selling high quality pieces.The prices were very high on all items and representative of the international market. However, my mere presence in the establishment threw the saleslady into a cold sweat as she feared I represented the "law" and was looking for evidence of illegally obtained products. If I hadn't been the slightest bit suspicious when I entered the place, I certainly was by the time I left. I was assured that all the ivory was legally purchased and worked from tusks originating in Gabon - despite the fact that I had not even asked the question. Ivory selling in the street was far cheaper: bracelets which should have cost about $50 were selling at about $20 and the price of ivory in polished tusks was about $25 per kg. These were the highest prices I saw anywhere in central Africa, although they were less than half of the price in Zimbabwe, Tanzania or Botswana. The French are well aware of the advantages of buying ivory in Gabon and many take significant quantities to France for resale.

The present policies for wildlife management in Gabon are under review at the moment. President Bongo is strongly committed to conservation and has taken the move of banning all hunting in his own province. The Director of Water, Forests and Hunting informed me that the country is in the process of restoring its Game Reserves (it does not have any gazetted National Parks), which are surrounded by hunting zones. It is hoped to increase the existing staff of some 300 employed in the Ministry in the near future, and introduce a system of rewards for found ivory. "Collection" has never been practised in Gabon.

All government raw ivory is routed to Libreville and sold through Domaines. Typical prices range from US $11/kg for tusks under 5 kg to $33/kg for tusks above 10 kg, and sales are by auction with some international buyers present. Although buyers are allowed to export, a negligible amount leaves the country. The extent of illegal exports of raw ivory from Gabon is unknown, but the Director believes that this is mainly ivory which has entered Gabon illegally.

Perhaps illegal hunting in Gabon has recently become significant. It is mainly done by outsiders - nationals of Senegal, Mali and Burkina Faso. In a newspaper article in Libreville a Gabonaise hunter (being something of a rarity) was interviewed, and explained that he had learned his hunting from the Senegalese by working for them over a number of years. I was told that the Gabonaise are in general afraid of elephant, and that they are sacred to many tribes. Gabon elephant are reputed to be small and aggressive and the locals avoid them. (I find difficulty in accepting this as it doesn't seem to bother the foreign hunters.) Pygmies are frequently employed to do the hunting, and the Gabonaise buy the ivory from them very cheaply, using pirogues on the extensive river systems to transport tusks to Libreville. In certain areas ex-patriate Europeans are also involved. The French airforce, which does not

go through customs checks and which is able to move freely between many central African countries, is said to have transported several shipments out of the country. There is a significant Lebanese community in Gabon which is reported to be exporting large amounts of ivory to Hong Kong. The above items of information were given to me by people selling worked ivory in Libreville.

Officially there is no worked ivory market in Gabon. Promogabon, which is an agency established to promote the development of small industries, has been unable to locate a single Gabonaise ivory carver, and the only artisan which they did find was a foreign national. Artisans carving ivory are not registered and it is known that they use mainly illegal ivory in their craft. The Director estimates that only about 30 % of this is of Gabon origin. Under the new laws all artisans will be registered and will have to use only marked and registered tusks in their work.

In Gabon, as in most of the other Central African countries, the domestic carving industry is the major problem to be tackled. Obviously the moves being made by the authorities are a step in the right direction, but my feeling is that if all government steps are totally restrictive it will be very difficult to improve matters. Some ideas for positive approaches are given under International Administration in this chapter.

I was left with the feeling that the wildlife authorities in Gabon really only took responsibility for the elephant in the Game Reserves and official hunting zones. Elephant in the remainder of the country appeared to be an unregistered asset with few rules regarding their exploitation. Perhaps I am mistaken.

Zaire

After the Sudan, Zaire is the largest country in Africa with an area of 2 345 410 sq km and a population of some 35 million people, largely concentrated in cities, towns and villages, leaving most rural areas sparsely populated. The elephant population is perhaps the largest in Africa and estimates, such as the one in this report, are based on the flimsiest of data.

The internal problems in controlling the exploitation of elephant and the flow of ivory in Zaire are stupendous. The sheer size of the country and inadequacy of communications from one extremity to the other make the task daunting. Perhaps here, more than in any country in Africa, is the futility of a government attempting to claim a monopoly on a resource such as elephant clearly evident. The full might of a small army would be required to implement such a policy, and because such an army is not available to the Zaire wildlife authorities (indeed, it is working on the opposite side at the moment!) their task is Herculean.

The President banned all hunting at the end of 1983 (at a time when a positive project on controlled hunting was being successfully implemented), but the act can only be likened to that of King Canute. Elephant continue to be hunted the length and breadth of Zaire. Ivory leaves via Burundi, Zambia, Tanzania, Uganda, Sudan, C.A.R. and Congo. The damage done by such a ban is considerable: it renders the statistics of exports from every surrounding country suspect, removes all the positive aspects of legitimate safari hunting operations and projects such as the one mentioned above, and leaves the field open for the daring, unscrupulous poacher. The evils in the situation are compounded by certain conservation lobbies demanding that the remainder of the world refuse to buy Zairian ivory: it is tantamount to saying to Zaire "because you banned hunting you can't have any ivory" and ignoring the de facto truth that the ivory has materialised nevertheless.

Under the Department of Environment, Conservation of Nature and Tourism are two branches both with a responsibility for wildlife: the IZCN (Zaire Institute for Conservation of Nature), which is responsible for the National Parks and Hunting Areas encompassing about 10% of the country, and the Division of Management of Natural Resources which handles the remaining areas. I was informed by outsiders that there is a degree of conflict between the two branches of the Department partly caused by the fact that the Division of Management of Natural Resources has been guilty of issuing numerous hunting permits (despite the ban), which do not specify limits on the number of animals which may be taken, in every province of the country. The IZCN is one of the CITES Scientific Authorities for the country and also plays a major part in the Department's role as CITES Management Authority and it is with them that I had all my dealings. I cannot stress too highly the degree of co-operation I enjoyed with the IZCN staff (whom I found to be highly competent): we established an excellent workshop atmosphere from the outset, and, as in Chad, very little attention was paid to nominal government working hours in the course of completing work which we had undertaken.

The major source of legal ivory in Zaire is confiscation. In 1984 the authorities seized some 1200 tusks weighing 5.5 tonnes. A large part of this arose from a shipment found on a private aircraft "in transit" through Zaire, and the remainder from poachers caught in the act. Almost no found ivory is returned to Government and the hunting ban precludes any killing for crop protection. Confiscated tusks are deposited in banks in the regions, prior to being moved to Kinshasa. Such ivory is graded and used to be sold to private dealers though the Office national de l'ivoire, although there have been no sales recently, pending the formulation of a new policy. The typical prices in such sales were about US $7/kg: the rate paid to poachers in the field is similar, and the dealers in Kinshasa buy illegal ivory at about US $25/kg. It is clear that the government price is very low, and an outsider might be forgiven for concluding that such a price indicates a degree of connivance between sellers and buyers.

The pattern of illegal hunting in Zaire is not what might be expected. Males with big tusks are very difficult to hunt as they tend to seek refuge in the depths of the forest. The tendency is to kill complete cow herds whenever they appear in open savanna type country where the visibility is good. Little illegal hunting takes place close to villages: the local population is only too willing to report poachers in the hopes of a reward. Elephant have learnt that there is a certain safety in the proximity of villages, and tend to congregate near them. This results in severe crop raiding, about which the authorities can do nothing because of the hunting ban. The situation would be amusing if it were not so serious.

The domestic carving industry consumes a large amount of illegal ivory , mainly small tusks. Prices in the market in Kinshasa are very low: an ivory bracelet worth US $50 sells at about US $10; a pair of polished tusks weighing about 7 kg sells at US $35 ($5/kg). I was informed that very little ivory came from areas near Kinshasa: most of it was being transported considerable distances. The authorities fully appreciate the problem and are trying to make an inventory of artisans at the moment. Their plan is to sell the existing stock of confiscated ivory to the carvers while exports are prohibited. By allowing the continued sale of ivory products worked from unlicensed tusks they are in fact sanctioning the illegal trade: with the hunting ban in force it should be almost impossible for the artisans to obtain ivory.

There is a need for the Zaire Government to face the fact that control of the exploitation of elephant in a country as large as theirs is impossible with

present numbers of staff, and with inadequate funds and equipment. As none of the above is likely to be forthcoming in the near future (or ever) there is only one option: a radical change in policy. The Government should seek a solution which uses the only real resource at its disposal - a population of millions of people. If the rural dwellers take over the husbandry of the elephant, with Government exercising an element of control, there is greater hope for the long term future than if present policies are pursued. A proposal to legalise poaching was discussed with the Zaire authorities (Appendix 14). Zaire has nothing to lose by attempting such a scheme and, if it is successful, they could lead the field in conservation in Africa.

Congo

The Congo is underpopulated with a population of about 2 million people in an area of 342 000 sq km. As in Gabon, there is an urban drift causing reduced rural densities. The lowest densities of humans occur in the north and west of the country, where the climate is equatorial and sub-equatorial with areas of dense tropical forest. The technical staff of Eaux et forêts informed me that the forest areas in Congo held higher elephant populations than the savanna, and that there were no "savanna" elephant in the Congo - only the forest and pygmy types. Estimates of elephant numbers, including the one in this report, are pure speculation. However, if the figures from the ivory trade are correct - even if half the tusks originate from Zaire - there should be thousands of animals.

I arrived in Congo shortly after the previous CITES Management Authority had been replaced with new incumbents and regrettably had far too little time to really cover much ground. The new secrétaire général of Eaux et forêts and his staff very graciously worked outside government working hours in order that we should achieve as much as possible. The quota system was approved in the Congo, but the authorities saw difficulties in implementing it. The biggest problem was the question of the number of elephant in the country, and there was the further problem of ivory from neighbouring countries entering the Congo illegally. However, the recent improvements in regional co-operation might reduce the flow. The Congo authorities now repatriate ivory confiscated from other countries, provided they can be sure of the origin: the problem is that illegal ivory usually carries little documentation.

The main source of ivory is from hunting permits of which about 300 per year are issued. Confiscation seldom yields more than 200 tusks per year, there is no control hunting, and very little is recovered from natural mortality. The Government sells all ivory to private dealers in the country, and tusks are marked according to the CITES procedures agreed in New Delhi, 1981. Typical ivory prices range from US $10/kg for tusks under 5 kg to US $50/kg for tusks above 20 kg. The country has a policy not to export tusks of less than 5 kg, and the hunting of animals with tusks below this limit is forbidden.

The Congo authorities favoured the introduction of a cropping system for elephant on the lines of the legalised poaching proposal for Zaire. Their view was that they already had a similar system for the exploitation of timber from forests which could easily be extended to include elephant. They pointed out that the risks of overexploitation, with Government having a monopoly, were as great as they would be with the rural communities utilising elephant - in fact they feared a situation where a person at a high level in Government might easily override their recommendations for hunting quotas and over-exploit the resource.

Zimbabwe

Zimbabwe has a population of about 8 million people increasing at a rate of at least 3.6% per annum in an area of 390 580 sq km. The elephant range is restricted to the periphery of the country in low rainfall areas (less than 800 mm year in average years), with elephant occurring in National Parks, Safari Areas, Forest Land, Communal Land and private land.

Legislation introduced in 1975 allows all game outside of gazetted protected areas to be used and managed by the landowner. This caused a proliferation of game ranching on private farms within the country, and in many areas game is beginning to replace cattle totally. The success of such operations was demonstrated in the recent two drought years, where farmers with game survived the drought and many made profits. To produce a profit the ranch relies on a combination of sport hunting, meat harvesting and secondary industries such as tanning of hides, carving work and fabrication of leather products (Child, 1984). The task facing the wildlife authorities at the moment is to extend this system of private ownership to the communal lands of Zimbabwe, where the Government at the moment still manages the wildlife pending the readiness of local communities to take over. Programmes are under way to achieve this (Martin, 1983; Martin, 1985). At present all money made from wildlife on communal land is returned by the Government to the local communities: this has amounted to over 2 million dollars in the last two years.

The main source of ivory in Zimbabwe is from culling operations in the Parks and Wildlife Estate. Ivory also originates from control hunting, confiscation and natural mortality. Apart from safari hunting trophies, all ivory moves from the provinces to the government ivory store in Harare. The large consignments of ivory from culling operations are marked in the provinces with the final registration number that they will carry on the government sales; other tusks are given a local number when entered into the ivory registers of field stations and are renumbered in Harare.

All ivory is sold on government auctions held 3 or 4 times a year using a private firm of professional auctioneers to conduct sales. Ivory is divided into "embargo" and "non-embargo" lots, the former for use in local industries and therefore not being allowed to leave the country, and the latter being for export. The need for Government to regulate the balance between the amount of ivory exported and the amount held in the country may soon fall away with the proportions being determined by free market processes. At present there is little difference between the prices paid for both types and Zimbabwe dealers compete for both embargo and non-embargo lots. In the future it is envisaged that all ivory will be consumed internally, but it will probably be advisable to allow international buyers to continue to compete for the ivory in order to prevent cartels forming amongst the local buyers. Small amounts of ivory may be sold out of hand from the ivory store between auctions, and the price for such lots is determined by the most recent auction prices. Ivory prices realised on the auctions are the highest in Africa and this is largely a result of having the international buyers participating in the auctions. Prices paid at the auction in October 1984 were US $20/kg for ivory chips, US $62/kg for 5 kg tusks, US $75/kg for 10 kg tusks, and over US $100/kg for tusks in excess of 20 kg.

It has been said of the Zimbabwean ivory prices that they are abnormally high because ivory is used as a means for citizens to move wealth out of the country. This pertains largely to worked ivory (Bradley Martin, 1984) rather than to raw ivory. All ivory bought by foreign dealers is paid for in foreign currency at the prevailing bank rates, and if local dealers wish to export

they have to secure the foreign currency for the Reserve Bank. Any attempt by a local dealer to export his ivory at a price lower than that which he paid for it would be picked up by the authorities very quickly.

All ivory dealers, ivory carvers and retail outlets selling worked ivory are registered with the authorities and the dealers and carvers pay a licence fee to Government. No private citizen other than a registered dealer may buy or sell ivory, other than in the odd rare case of a sale of trophy tusks from sport hunting (which transaction has to be recorded with the authorities). All dealers, carvers and retailers send monthly returns to Government. The dealer declares all tusks bought and sold, citing the tusk numbers of each, and the carver who received it. Carvers declare all raw ivory bought, including tusk numbers and the dealer who provided the tusk, and the nature and description of all worked ivory items carved from each tusk and to whom sold. Retailers declare the amounts of worked ivory received from carvers, and to whom sold. Persons buying worked ivory from retailers are issued with a CITES Form 1 by the retailer which will allow the export of worked ivory from the country and its import into another country. Whilst the necessity of CITES procedures for this worked ivory may be questioned, the authorities choose to implement them, not so much to satisfy international requirements as to enforce a high level of control and elevate the status of ivory within the country. The above system of returns by the various persons engaged in the ivory trade allows checking of all tusks from their point of origin to the retail outlet. It may appear to require a great deal of clerical work, but this is not actually the case. It is only when a particular individual is suspected of fraud that the returns need to be inspected in detail.

If I have any criticism of the worked ivory industry in Zimbabwe it is for the low quality of the products produced. Unlike certain central and west African countries, Zimbabwe carved ivory consists largely of tasteless replicas of wild animals and "westernised" African figures of no aesthetic value whatsoever. It is time the local industry employed the best Shona sculptors whose work is sought after by international collectors and commands very high prices. In this way the industry might do more to justify its use of ivory.

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APPENDIX I

CHAD ELEPHANT POPULATION

Prefecture No. 1:	Lac Bol	500 -	700
Prefecture No. 2:	Batha (Ati)	70 -	100
Prefecture No. 5:	Chari-Banguirmi	300 -	450
Prefecture No. 6:	Bongor (Mayo-Kebbi)	50 -	150
Prefecture No. 7:	Tangile & Logon-Orientale	100 -	135
Prefecture No. 8:	Moyen Chari (Sarh)	200 -	350
	Salamat	800 -	1000
	TOTALS	2020	2885

Notes:

1. In the Lake Region (Lac Bol) there are generally very few elephants. During the war these emigrated to Nigeria, but are now returning (possibly due to heavy poaching in Nigeria).

2. The elephant seen in Batha were counted from the air in the desert.

3. All elephant in Chari-Banguirmi are in the vicinity of N'Djamena. One concentration is 80 km north of the capital, and the other 53 km south.

The elephant population of Chad exceeded 15 000 in 1979. Many animals left the country during the war and are now returning. They are now forming very large herds which is a typical response to hunting pressure. The only area which was relatively undisturbed during the war was the south-east region (Salamat), although Sudanese poachers are known to operate there.

The total area of Chad is 1 284 000 sq km. The majority of this is desert and elephant generally occur south of the 400 mm rainfall isohyet giving a range of about 400 000 sq km. There may be slightly fewer elephant than expected in the highest rainfall zone (1300 mm) in the extreme south-west corner of the country, mainly because of agriculture.

CONGO ELEPHANT POPULATION

(See Appendix 4 for Method)

REGION		Sub-region	ELEPHANT Area sq km x1000	Rain mm.x 1000	Dmax per sqkm	Max E x 1000	HUMAN POPULATION Urban Pop x 1000	Rural Dens. /sqkm	Rural Pop x 1000	Total Pop x 1000	E-H/15 x 1000	R1	R2	R3	FINAL E Pop x1000
LIKOUALA	1.	Dongue	30.8	1.6	2.0	61.6	7	0.8	24.6	31.6	59.5	2	4	5	17.9
	2.	Epena	24.4	1.7	2.0	48.8	-	0.8	19.5	19.5	47.5	2	4	5	14.3
	3.	Impfondo	6.6	1.6	2.0	13.2	7	0.8	5.3	12.3	12.4	2	2	5	1.2
SANGA	4.	Souanke	12.5	1.7	2.0	25.0	7	0.8	10.0	17.0	23.9	2	4	5	7.2
	5.	Sembe	9.2	1.6	2.0	18.4	7	0.8	7.4	14.4	17.4	2	4	5	5.2
	6.	Ouesso	29.1	1.7	2.0	58.2	14	0.8	23.3	37.3	55.7	2	1	5	1.1
CUVETTE	7.	Mbomo	10.1	1.8	1.9	19.2	-	0.8	8.1	8.1	18.7	2	4	4	4.2
	8.	Kelle	7.8	1.9	1.8	14.0	14	1.7	13.3	27.3	12.2	2	2	4	.9
	10.	Ewo	7.1	2.0	1.6	11.4	7	1.7	12.1	19.1	10.1	2	2	4	.8
	11.	Boundji	2.1	1.9	1.8	3.8	7	3.0	6.3	13.3	2.9	2	1	4	.1
	15.	Okoyo	9.4	2.1	1.5	14.1	-	1.7	16.0	16.0	13.0	2	1	4	.2
PLATEAU	16.	Abala	7.3	1.8	1.9	13.9	-	3.0	21.9	21.9	12.4	2	1	1	.1
	17.	Lekana	4.0	2.2	1.3	5.2	7	3.0	12.0	19.0	3.9	2	1	1	.1
LEKOUMOU	20.	Komono	4.9	1.8	1.9	9.3	7	3.0	14.7	21.7	7.9	2	3	4	1.2
	21.	Bambama	3.3	2.1	1.5	5.0	-	1.7	5.6	5.6	4.6	2	3	4	.7
	22.	Zanaga	5.4	2.0	1.6	8.6	7	3.0	16.2	23.2	7.1	2	3	4	1.1
	23.	Sibiti	6.8	1.6	2.0	13.6	14	5.0	34.0	48.0	10.4	2	1	4	.2
POOL	30.	Kindamba	8.5	1.7	2.0	17.0	7	3.0	26.5	33.5	14.8	2	1	2	.1
	32.	Ngabe	8.9	1.7	2.0	17.8	7	1.7	15.1	22.1	16.3	2	2	2	.4
NIARI	38.	Mayoko	3.8	1.9	1.8	6.8	5	3.0	11.4	16.4	5.7	2	1	4	.1
	39.	Kibangou	7.3	1.4	1.8	13.1	-	3.0	21.9	21.9	11.6	2	1	4	.2
KOUILOU	43.	Madingo-Kayes	8.2	1.5	1.9	15.6	-	3.0	24.6	24.6	14.0	2	3	3	1.4
	44.	Mavouti	4.9	1.7	2.0	9.8	14	3.0	14.7	28.7	7.9	2	2	3	.4
														TOTAL	59.1

Note: The following sub-regions no longer contain elephant:-

CUVETTE - 9. Makua, 12. Owando, 13. Mossaka, 14. Loukolela.
PLATEAU - 18. Djambala, 19. Gambona.
BOUENZA - 24. Loudima, 25. Nkayi, 26. Madingou, 27. Mouyondzi, 28. Boko-Songho, 29. Mfouati.
POOL - 31. Mayama, 33. Mindouli, 34. Kinkala, 35. Ngamaba, 36. Boko.
NIARI - 37. Divenie, 40. Mossendjo, 41. Loubomo, 42. Kimongo.
KOUILOU - 45. Louandjili.

APPENDIX 3

GABON ELEPHANT POPULATION
(See Appendix 4 for Method)

	PROVINCE	Area sq km x1000	Rain mm.x 1000	ELEPHANT Dmax per sqkm	ELEPHANT Max E x 1000	HUMAN Total Pop x1000	E-H/15 x 1000	R1	FINAL E Pop x1000
1.	ESTUAIRE	20.1	2.4	.9	18.2	622.3	-23.2	1	1.0
2.	HAUT-OGOOUE	35.3	1.9	1.8	63.5	344.8	40.5	2	4.1
3.	MOYEN-OGOOUE	18.2	2.0	1.6	29.1	44.0	26.2	2	2.6
4.	NGOUNIE	38.7	2.0	1.6	61.9	109.0	54.6	2	5.5
5.	NYANGA	19.6	1.6	2.0	39.2	121.0	31.1	2	3.1
6.	OGOOUE-IVINDO	44.2	1.7	2.0	88.4	50.0	85.1	2	8.5
7.	OGOOUE-LOLO	30.0	1.8	1.9	57.0	44.0	54.1	2	5.4
8.	OGOOUE-MARITIME	24.1	1.9	1.8	43.4	290.4	24.0	2	2.4
9.	WOLEU-NTEM	37.5	1.7	2.0	75.0	184.4	62.7	3	15.7
								TOTAL	48.3

Notes:

1. No data available for ranks R2 and R3.
2. The method predicts that elephant should be extinct in Estuaire province. There are in fact a few remaining, and these have been arbitrarily estimated at 1000.
3. Illegal hunting is high throughout Gabon, and hence the rank of 2 for most provinces. The reason Woleu-Ntem is ranked 3 is that one half of the province is totally unsettled and without access.
4. Human populations have been estimated by extrapolating the trends in each province during the period 1970-1976. These are not uniformly upward: some provinces are increasing at a rate of as much as 8% through immigration, while the population in others is declining.
5. All data are taken from Geographie et Cartographie du Gabon (1983).

APPENDIX 4

ZAIRE ELEPHANT POPULATION

An estimate has been made for the elephant population of Zaire by combining the hypothesis of Parker (1984) with the best available knowledge of the technical staff of the IZCN. Parker's hypothesis is that, in the absence of human beings, elephant will reach a certain maximum density based on rainfall and geology. Because elephants and human beings compete for the same resources, the number of elephants will decrease as human populations increase, and the nature of the relationship is determined largely by the metabolic biomass of the two species.

This method uses the relationship derived by Parker between elephants and rainfall, but rather than incorporate his factors for increasing or decreasing the density according to geology, I have used local knowledge coupled with inspection of the vegetation map for Zaire to perform this adjustment.

The method entails the following steps:

1. Zaire has been divided into its 24 sub-regions, and the area of each was calculated with a digitiser.

2. Each province has been assigned a mean rainfall category by inspection of the precipitation map for Zaire.

3. A maximum density for elephant in the absence of humans has been interpolated from the graph of Parker (1984) showing rainfall versus density. The values used are shown in Table 1 of this Appendix.

4. Provisional elephant populations for each province have been calculated using this density and the area of the province.

5. The human urban population in each province has been estimated from the map in Atlas Jeune Afrique, taking into account increase since 1974.

6. A human rural population density was estimated from the same map and adjusted for increase since 1974.

7. The rural population in each province was calculated using this density and the area of the province.

8. The total human population in each province was obtained by summing urban and rural populations.

9. The human population in each province was then divided by 15 (Parker used 15.4 humans as the equivalent of an elephant's metabolic biomass), and subtracted from the provisional number of elephant derived in Step 4 above.

10. Using the local knowledge of 8 persons, each province was then ranked on a scale of 0 - 5 for three attributes:

    R1: The current level of illegal hunting.

    R2: The current state of abundance of elephant.

    R3: The suitability of the area for elephant, taking into account the vegetation types and the historic knowledge of abundance.

11. A multiplier factor was then arbitrarily allocated for each ranking and this was used to increase or decrease the elephant population estimate derived in Step 9. A full list of the criteria for ranking and the multiplier factors associated with each ranking are given in Table 2 of this Appendix.

12. The final elephant population estimate in each province is the result of three successive multiplications using these factors (Table 3). In cases where the result was very small a minimum value of 100 elephant was given to the province.

Discussion

Parker (1984) is the first to admit that better data are needed to establish the relationship between elephant and rainfall than were at his disposal. I have examined the data from the different areas which make up Parker's mean value in each rainfall category and note that in the lower rainfall classes these are not normally distributed. However, East (1984) has given regressions for elephant and rainfall up to a maximum rainfall of 700 mm and his and Parker's values correspond almost exactly up to 600 mm, at which point Parker's curve falls below the linear regression. The three countries in which I have applied the relationship all fall into rainfall classes well above this level, and it may be that the predicted densities are too high for the types of forests involved. Parker also points out that elephant populations are seldom stable and fluctuate about some mean value, or are at various stages of a stable limit cycle (Caughley, 1974). In the absence of other work on the subject, Parker's data provide a useful starting point.

It seems somewhat crude to subtract one elephant for every 15 human beings in the area. Parker (1984) does not use his data in this manner, and may never have intended it to be applied in such a way. The technique presupposes a complete coincidence of ecological niches, which is not actually the case. Parker shows that the relationship between humans and rainfall peaks at a slightly lower rainfall than the graph for elephant, but notes that with increasing human populations the peak seems to be shifting towards that shown by elephant. In this exercise, it is of interest to note that in those provinces where a negative result is obtained by subtracting one elephant for every 15 humans, elephants are in fact extinct, and in the provinces where a very low value or slightly negative value occurs, elephant are almost extinct. This lends a first degree of credibility to the method.

The weakest part of the method lies in the multiplier factors associated with different degrees of illegal hunting. I have assumed that over and above the relationship derived from Parker (1984), there may be fewer elephant than indicated. Parker argues (pers. comm.) that the interaction between humans and elephant tends to occur on the interface between expanding human settlement and the natural range of the elephant. Therefore there should be no reason to go any further than Step 9 of the exercise to predict the number of elephant. However, in the countries where the method has been applied, there is strong evidence that the illegal hunting is taking place a long way from this interface and is not simply a displacement of elephants by humans. The multiplier factors I have used to decrease the elephant estimate according to the degree of hunting are very severe and should lead to an underestimate of elephant if anything. For example, where illegal hunting is classed as high I

have divided by 10, and if very high, by 20. This assumes 90% and 95% of the population respectively has been removed. Notwithstanding, the estimates appear very high compared to previous figures. In support of the figures, the high sustained yield of ivory in the past (Parker, 1979), recent high tonnages (Caldwell, 1984), and the very large undisturbed areas suggest that the populations should be large.

The multiplier factors used for the present knowledge of elephant abundance and the suitability of the area for elephant do not affect the results as greatly as the factor for illegal hunting. The latter is capable of altering the estimate by an order of magnitude, whereas the former will at most double or halve the estimate.

The advantage of the method is that it does subdivide the country into smaller manageable units, and at least give the relative relationship between provinces.

Table 1: Maximum elephant densities in the absence of human presence for a range of mean rainfall categories. Data interpolated from the graph of Parker (1984).

Rainfall (mm)	Density (/sqkm)
200	0
300	.1
400	.2
500	.3
600	.4
700	.6
800	.8
900	.9
1000	1.1
1100	1.3
1200	1.5
1300	1.6
1400	1.8
1500	1.9
1600	2.0
1700	2.0
1800	1.9
1900	1.8
2000	1.6
2100	1.5
2200	1.3
2300	1.1
2400	.9

Table 2: Ranking criteria and multiplication factors for three parameters affecting elephant populations.

R1: Illegal Hunting

Rank	Description	Multiplier
0	Elephant exterminated.	0
1	Intense hunting of all age classes for ivory and meat.	.05
2	High level, selective for ivory, all tusk bearing animals.	.1
3	Medium level, adults of both sexes, ivory only.	.25
4	Low level, occasional adult males.	.5
5	No hunting.	1.0

R2: Known presence of elephant

0	Elephant are never seen in area, neither are there signs.	0
1	Very low numbers: occasional signs, rare sightings.	.1
2	Below average: known to be present, but not common.	.5
3	Average: numbers as expected in this area.	1.0
4	Above average: more animals than surrounding areas.	1.5
5	Abundant: Unusual concentrations found in area.	2.0

R3: Suitability of area for elephant: habitat and historic record

0	Area unsuitable for elephant, never been know to occur.	0
1	Inhospitable habitat, elephant seldom recorded.	.1
2	Habitat not preferred, elephant historically sparse.	.5
3	Average area for elephant, neither abundant nor rare.	1.0
4	Favourable habitat, elephant historically common.	1.5
5	Outstanding habitat known for spectacular numbers.	2.0

Table 3: ZAIRE ELEPHANT POPULATION

REGION		Sub-region	ELEPHANT Area sq km x1000	Rain mm.x 1000	Dmax per sqkm	Max E x 1000	HUMAN POPULATION Urban Pop x 1000	Rural Dens. /sqkm	Rural Pop x 1000	Total Pop x 1000	E-H/15 x 1000	R1	R2	R3	FINAL E Pop x1000
BAS-ZAIRE	1.	Bas-Fleuve	14.3	1.2	1.5	21.5	140	25	357.5	498	-11.7	0	0	2	0
	2.	Cataractes	40.8	1.7	2.0	81.6	420	25	1020.0	1440	-14.4	0	0	1	0
BANDUNDU	3.	Mai-Ndombe	123.4	1.6	2.0	246.8	140	7	863.8	1004	179.9	2	2	4	2.7
	4.	Kwilu	81.7	1.6	2.0	163.4	380	20	1634.0	2014	29.1	1	1	3	.1
	5.	Kwango	89.3	1.6	2.0	178.6	40	5	446.5	487	146.1	2	1	2	.7
EQUATEUR	6.	Equateur	99.5	1.8	2.0	199.0	140	5	497.5	638	156.5	2	5	4	47.0
	7.	Tshuapa	135.0	2.0	1.6	216.0	40	5	675.0	715	168.3	2	4	4	37.9
	8.	Mongala	105.1	1.7	2.0	210.2	140	8	840.8	981	144.8	2	4	4	32.6
	9.	Oubangu	66.8	1.6	2.0	133.6	100	15	1002.0	1102	60.1	2	4	4	13.5
HAUTE-	10.	Tshopo	197.6	1.7	2.0	395.2	420	6	1185.6	1606	288.1	2	4	3	43.2
ZAIRE	11.	Bas-Uele	146.2	1.7	2.0	292.4	70	7	1023.4	1093	219.5	2	5	5	87.8
	12.	Haut-Uele	94.9	1.6	2.0	189.8	140	12	1138.8	1279	104.5	3	4	4	58.8
	13.	Ituri	66.7	1.7	2.0	133.4	70	8	533.6	604	93.1	2	2	3	4.7
KIVU	14.	Nord-Kivu	60.5	1.8	1.9	115.0	250	7	423.5	674	70.1	3	1	2	.9
	15.	Sud-Kivu	57.8	1.8	1.9	109.8	420	10	578.0	998	43.3	4	1	3	2.2
	16.	Maniema	129.0	1.8	1.9	245.1	210	10	1290.0	1500	145.1	2	5	4	43.5
SHABA	17.	Tanganika	124.0	1.2	1.5	186.0	320	6	744.0	1064	115.1	3	4	2	21.6
	18.	Haut-Lomami	107.1	1.3	1.6	171.4	140	14	1499.4	1639	62.1	4	2	4	23.3
	19.	Haut-Shaba	125.9	1.1	1.3	163.7	1160	7	881.3	2041	27.6	1	1	2	.1
	20.	Lualuba	122.3	1.3	1.6	195.7	210	7	856.1	1066	124.6	1	1	2	.3
KASAI-	21.	Kabinda	64.9	1.4	1.8	116.8	530	15	973.5	1504	16.5	4	3	3	8.3
ORIENTAL	22.	Sankuru	103.4	1.6	2.0	206.8	20	7	723.8	744	157.2	4	3	3	78.6
KASAI-	23.	Kasai	93.8	1.6	2.0	187.6	180	20	1876.0	2056	50.5	2	2	4	3.8
OCCIDENTAL	24.	Lulua	58.9	1.6	2.0	117.8	700	20	1178.0	1878	-7.4	4	1	4	.1
														TOTAL	522.5

Notes: Kinshasa with a population of some 4 000 000 has not been included.
Elephant are extinct in Bas-Zaire region.
There are a small number of elephant left in Lulua sub-region, notwithstanding the negative value of above.

APPENDIX 5

ETHIOPIA ELEPHANT POPULATION

PROTECTED AREAS

Omo/Mago Complex	2 000
Omo National Park Mago National Park Tama Wildlife Reserve Murle-Kenya Controlled Hunting Area	
Akoba Complex	4 000
Gambella Reserve Akoba Controlled Hunting Area Omo West Controlled Hunting Area Jokau Controlled Hunting Area Tedo Controlled Hunting Area	
Mizan Teferi & Guraferda Forest	2 000
Harrar Wildlife Sanctuary	300
(includes Harrar-Webi Shebele C.H.A.)	
Bash-Setit Wildlife Reserve	250
Metekel and Dabus Valley C.H.A.	400
Borana Complex (see note)	50
Borana Controlled Hunting Area Murle-Kenya Border C.H.A. Chew Bahar Wildlife Reserve Yabello Wildlife Sanctuary	
TOTAL	9 000

Note: It is doubtful whether the areas listed in the Borana complex contain any elephant. The small estimate has been included as a contingency which also rounds the total number up to 9 000.

The other Protected Areas in Ethiopia do not contain elephant, and it is doubtful if there are any elephant outside the above areas.

APPENDIX 6

KENYA ELEPHANT POPULATION

All data are taken from Kenya Rangeland Ecological Monitoring Unit (KREMU) publication by Stelfox et al. (1984). The Kenya Wildlife Conservation and Management Department advises that they regard KREMU as the official source for estimates.

The most recent data from KREMU are for 1983 and certain areas were not surveyed during this year. To obtain estimates for the missing areas, I have firstly taken those areas which were surveyed in 1977, 1978, 1980-81, and 1983 to compute a trend factor, and then used the most recent estimates from previous years, adjusted for trend, to fill the missing gaps.

Trend: The following areas were included in all KREMU surveys

	1977	1978	1980-81	1983
Kajiado	484	76	646	655
Kilifi	1586	25	338	72
Kitui	2671	4134	3698	699
Lamu	4916	1909	3535	2118
Narok	1174	2668	2274	2474
Taita/Taveta	13324	17552	12898	12291
Tana River	9483	3565	5745	1340
TOTALS	33638	29929	29134	19649

The 1983 totals is 0.67 of the total for 1980-81 and 1978. I have not tested for significance and it is quite possible that the trend is not a real one owing to the variability of the data. However, I have used 0.67 as the factor to interpolate missing estimates in the 1983 data. Interpolated estimates are marked with an asterisk.

1983 estimates

Baringo	95*
Garissa	3 661
Isiolo	1 154*
Kajiado	655
Kilifi	72
Kitui	699
Kwale	224
Laikipia	1 197*
Lamu	2 118
Mandera	229*
Marsabit	155*
Narok	2 474
Samburu	626*
Taita/Taveta	12 291
Tana River	1 340
Turkana	775*
Wajir	62*
West Pokot	129*
TOTAL	27 956

APPENDIX 7

MALAWI ELEPHANT POPULATION

Figures from Dr. R.H.V. Bell (Senior Parks and Wildlife Officer).

	Area sqkm	Estimate	Limits	Source
Nyika National Park	3134	100		B
Vwaza Marsh Game Reserve	1000	300	(300-500)	A
Kasungu National Park	2316	800		A
Nkhotakota Game Reserve	1802	400	(300-500)	C
Thuma Forest Reserve	200	50		D
Phirilongwe Forest (proposed reserve)	200	100		C
Liwonde National Park	548	300		A
Mangochi/Namizumi Area	600	100		D
Majete Game Reserve	690	200		A
TOTALS	10490	2350		

Sources:
A - Aerial Surveys, regular field patrols, dropping counts.
B - Dropping counts, direct counts.
C - Preliminary survey, dropping counts.
D - Informed guess.

Notes:
In Vwaza Marsh G.R. there is some movement in and out of Zambia.

Kasungu N.P. population is highly localised within the Park.

Population in Majete G.R. seldom occupies more than 10% of the protected area; the majority live in an open area to the north. The population of Majete proper is seldom more than 60 animals (information from Brian Sherry).

APPENDIX 8

MOZAMBIQUE ELEPHANT POPULATION

The following information was given to Iain Douglas-Hamilton by José Tello in December 1984, and is reproduced here with Tello's permission. The data are based on informed guesses.

Northern Region (Niassa, Cabo Delgado)	
Ruvuma - Lugenda West	10 000
Ruvuma - Lugenda East	5 000
Remainder of Region	2 000
Central Region	
Gile Game Reserve & Entre Ri	50
Zambezi North Bank	200
Gorongosa National Park	2 000
Zambezi Valley UT	1 500
Hunting Block 2	250
Hunting Block 6	1 000
Remainder of Region	2 000
Tete Province	
Zumbo Fingoe	200
Furancungo	50
Messenguezi	75
Chioco	25
Southern Mozambique	
Save-Busi	500
Zinave	500
Banhine	750
Emofauna area (Limpopo)	50
Olifanti-Incomati	0
Maputo	200
Remainder	1 000
TOTAL	27 350

Note: This represents a decrease of some 46% since 1982.

APPENDIX 9

ZAMBIA ELEPHANT POPULATION

The following estimates were made by George Mubanga (Senior Wildlife Research Officer) based on information from staff in the areas concerned.

NATIONAL PARKS	Area	Estimate	Notes
1. North Luangwa	4 636	7 000	Aerial Surveys: 1973-17700, 1979-7360
2. South Luangwa	9 050	18 000	1973-31600, 1979-22800
3. Lukusuzi	2 720	3 500	1973-9100, 1979-4500
4. Luambe	254	300	1973-850, 1979-420
5. Mweru Wantipa	3 134	1 000	No surveys, based on patrol sightings.
6. Nsumbu	2 020	800	" " " " " "
7. Lusenga Plain	880	500	Informed guess.
8. Isangano	840	200	Hon. Ranger's info. Heavy Poaching.
9. Lavushi Manda	1 500	50	Heavy Poaching, probably lost cause.
10. Kasanka	390	50	" " from Copperbelt.
11. Kafue	22 400	4 000	Air Survey 1977-3700, low poaching.
12. Nyika	80	0	
13. Lochinvar	410	0	
14. West Lunga	1 684	350	Security problem, infiltrators poaching
15. Liuwa Plain	3 660	350	As for West Lunga.
16. Sioma Ngwezi	3 527	2 500	Based on field patrols.
17. Mosi-Oa-Tunya	66	0	
18. Blue Lagoon	450	0	
19. Lower Zambezi	4 090	4 000	Low human densities, some poaching.
20. Ncete Sanctuary	15	50	Direct count in bird sanctuary.
TOTALS	61 806	42 650	

OVERALL:	Area	Elephant
NATIONAL PARKS	61 806	43 000
GAME MANAGEMENT AREAS (see overleaf)	159 713	14 000
FOREST AREAS, REMAINDER OF COUNTRY		1 000
GRAND TOTALS	221 519	58 000

GAME MANAGEMENT AREAS

	Area	Estimate	Notes
1. West Zambezi	38 070	750	Military poaching in area.
2. Kasonso Busanga	7 780	50	Migrants from Kafue NP. 50 permanent.
3. Chizera	2 280	0	Occasional animals from W. Lunga.
4. Musele-Matebo	3 700	10	Military operations in area.
5. Lukwakwa	2 540	10	" " "
6. Chibwika-Ntambu	1 550	10	" " "
7. Lunga-Luswishi	13 340	50	As for 2. Kasonso Busanga
8. Sichifula	3 600	500	Low poaching, large tuskers.
9. Mulobesi	3 420	1 000	" " " "
10. Bilili Springs	3 080	0	Area heavily encroached by humans.
11. Kafue Flats	5 175	0	
12. Mazabuka		0	Degazetted.
13. Namwala	3 600	0	Occasional animals from Kafue.
14. Mumbwa	3 370	250	(200-300) High poaching, near Lusaka.
15. Luano	8 930	2 600	Based on density estimate of 0.3.
16. -------			
17. West Petauke	4 140	50	Dense settlement, heavy poaching.
18. Chisomo	3 390	50	" " " "
19. Sandwe	1 530	0	As for 17 & 18. Threat to Luangwa NP.
20. Lupande	4 840	2 400	Based on density estimate of 0.5.
21. Lumimba	4 500	3 000	Air survey 1973-12500, 1979-3350.
22. Musalangu	17 350	500	Heavy poaching from the north.
23. Machiya-Fungulwe	1 530	0	
24. Munyamadzi	3 300	2 000	Air survey 1973-6700, 1979-3350.
25. Kafinda	3 860	0	Elephant eliminated by development.
26. Bangweulu	6 470	50	Not preferred habitat, poaching.
27. Chambeshi	620	0	
28. Luwingu	1 090	0	As for No. 25 Kafinda.
29. Tondwa	540	20	Heavy settlement and poaching.
30. Kaputa	3 600	20	" " " "
31. Mansa	2 070	300	Socially protected in Chief's area.
32. Nkala	194	0	Occasional Kafue migrants.
TOTALS	159 949	13 620	

APPENDIX 10

ZIMBABWE ELEPHANT POPULATION

Information from Dr. D.H.M. Cumming (Chief Ecologist)

Hwange National Park	16 716
Zambezi Valley Complex	11 000
Mana Pools National Park	
Charara Safari Area	
Urungwe Safari Area	
Sapi Safari Area	
Chewore Safari Area	
Dande Safari Area	
Doma Safari Area	
Sebungwe Region	9 291
Matusadona National Park	1 283
Chizarira National Park	1 822
Chete Safari Area	815
Chirisa Safari Area	1 771
Sijarira Forest Area)	
Kavira Forest Area)	
Omay Communal Land)	3 600
Binga Communal Land)	
Gokwe Communal Land)	
Gona Re Zhou National Park	3 937
Matetsi Complex	4 033
Matetsi Safari Area	
Kazuma Pan National Park	
Zambezi National Park	
Victoria Falls National Park	
Deka Safari Area	
Remainder of country	2 000
Tuli Safari Area and SW Matabeleland	
Forest Areas in Matabeleland North	
SE Lowveld, excluding Gona Re Zhou	
Zambezi Valley Communal Lands	
NE Mashonaland	
TOTAL	46 977 ± 3 000

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Fifth Meeting of the Conference of the Parties

Buenos Aires (Argentina), 22 April to 3 May 1985

RESOLUTION OF THE CONFERENCE OF THE PARTIES

Trade in Ivory from African Elephants

WHEREAS illegal trade in ivory now imperils the future of some populations of African elephant and could imperil others if it continues at its present level, thus depriving producer countries of the wildlife and economic benefits provided by their elephant populations, within the policy laid down by producer countries for their management;

WHEREAS Resolution Conf. 3.12, adopted at the third meeting of the Conference of the Parties (New Delhi, 1981), defines the terms 'raw' and 'worked' ivory and goes some way towards tightening the control of trade in ivory;

WHEREAS Resolution Conf. 4.14, adopted at the fourth meeting of the Conference of the Parties (Gaborone, 1983), directed the Technical Committee to draw up guidelines for controlling the trade in worked ivory as quickly as possible, and in so doing to liaise closely with African Parties as well as other Parties having elephant populations;

RECOGNIZING that a number of African states already operate successful management programmes to conserve their elephant populations;

RECOGNIZING that African and Asian ivory are indistinguishable and that as the Asian elephant is listed in Appendix I there is a need to ensure that the trade in African ivory does not further endanger the Asian elephant;

WELCOMING the recommendations adopted by the 7th session of the Working Party on Wildlife Management and National Parks of the FAO African Forestry Commission in September 1983 and the Resolution on Trade in Raw African Ivory adopted by 24 African Parties to the Convention at the Seminar on CITES Implementation in Africa, held in Brussels, Belgium, in June 1984;

NOTING that the effective co-ordination of ivory trade controls by the Secretariat of the Convention cannot be performed without the provision of adequate resources, including staff;

THE CONFERENCE OF THE PARTIES TO THE CONVENTION

RECOMMENDS

a) that commencing by 1 December 1985, each state containing a population of African elephants and wishing to export raw ivory establish, as part of its management of the population, an annual export quota for raw ivory expressed as a maximum number of tusks;

b) that export permits for raw ivory issued by producer Parties who have set quotas as recommended in a) above be regarded as consistent with the conservation of elephant populations and their habitats in the country of origin, as discussed at the combined meeting of the African Elephant and Rhino Specialist Groups of the Species Survival Commission of IUCN held in Hwange (Wankie), Zimbabwe, in August 1981;

c) that each quota be communicated to the CITES Secretariat in writing by 1 December for the next calendar year;

d) that the CITES Secretariat assist in the implementation of the quota system by maintaining a central database, circulating a list of current quotas not later than 1 January of each year, preparing and distributing for the guidance of the Parties (and non-Parties) a practical manual describing the most effective procedures for implementing this Resolution, and providing advice on the conservation status of African elephant populations;

e) that if the quota is not submitted by the deadline, the state in question have a zero quota until such time as it communicates its quota in writing to the Secretariat and the Secretariat in turn notifies the Parties;

f) that there be no export, re-export or import of raw ivory as defined by Resolution Conf. 3.12 unless it is marked in accordance with that Resolution or in accordance with the Secretariat manual referred to in recommendation d) above;

g) that Parties accept raw ivory from producer states only where the date on the export permit is for a year in which the producer state has a quota in accordance with this Resolution;

h) that Parties may accept raw ivory from producer non-Party states only where the non-Party state files an annual report with the CITES Secretariat on its ivory trade, and meets all the other conditions in this Resolution, Resolution Conf. 3.12 and Article X of the Convention (as interpreted by Resolutions adopted by the Conference of the Parties);

i) that in compiling their annual reports, producer Party and producer non-Party states that have exported raw ivory relate such exports to their quota for any given year, providing the Secretariat with as much relevant data possible, including, as a minimum, the number of whole or substantially whole tusks, and their individual weights and serial numbers;

j) that, until such time as the Technical Committee produces guidelines for control of worked ivory in accordance with Resolution Conf. 4.14, all trade in worked ivory continue to be subject to the provisions of the Convention which do not require worked ivory exported or imported as personal or household effects to be included in annual reports;

k) that all Party states seek to route raw ivory exports to countries of destination only through Party states or non-Party states which have adopted ivory trade measures in conformity with this Resolution;

l) that all Parties take stock of raw ivory currently held in their states which may be destined for international trade, that they report the information to the Secretariat by 1 December 1986 for circulation to the Parties, and that they mark all such ivory in accordance with paragraph f) above prior to export or re-export if not already so marked;

m) that all Parties include in their annual reports complete data on imports, exports and re-exports of raw ivory including, as a minimum, the country of origin, the quota year that the export was authorized, the number of whole or substantially whole tusks, and their individual weights and serial numbers;

n) that all trade in raw ivory be prohibited with or through any state that does not conform with the ivory quota and trade requirements of CITES as advised by the Secretariat and confirmed by the Standing Committee of the Conference of the Parties; and

o) that Parties assist the Secretariat to ensure that the duties set out in this Resolution are carried out; and

APPEALS to all governments, non-governmental conservation organizations and other appropriate agencies to provide funds for the resources required in the Secretariat and producer states to ensure that the recommendations in this Resolution can be effectively implemented.

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES
OF WILD FAUNA AND FLORA

Fifth Meeting of the Conference of the Parties

Buenos Aires (Argentina), 22 April to 3 May 1985

Interpretation and Implementation of the Convention

Trade in Ivory from African Elephants

CO-ORDINATION OF IVORY TRADE CONTROLS

This document has been prepared by the Secretariat.

1. BACKGROUND

1.1 Proper control of the international trade in raw ivory is very important, both to CITES and to the countries involved. The 24 African countries Party to CITES that attended the Seminar on the Implementation of CITES in Africa (Brussels, Belgium, June 1984) adopted a resolution on this subject. That resolution led directly to the draft resolution prepared by the Technical Committee and under consideration (in slightly revised form) as document Doc. 5.22 Annex 1. Both these resolutions call for the simultaneous establishment of an "export quota" system and improved trade controls. It seems that there is general agreement on the principles and that only the details remain to be finalized.

1.2 Acknowledging that it was the will of the African Parties (with the agreement also of TEC) to have such new procedures established, the Secretariat designed a project which was aimed at providing the necessary basis. The project was funded entirely by the Commission of the European Communities to whom the Secretariat wishes to express its sincere gratitude for providing the necessary financial support at such short notice.

1.3 The project was conducted in Africa by Rowan B. Martin and in Cambridge, U.K., by WTMU. Rowan Martin's report is presented in document Inf. 5.3 and WTMU's report is document Inf. 5.4. Although these documents are available only in English at the moment, the Secretariat anticipates publishing both reports (together) in English, French and Spanish as soon as possible.

1.4 The Secretariat wishes to express its gratitude to the Government of Zimbabwe for allowing Rowan Martin to undertake this project. It wishes also to thank the authors of both reports for their excellent work and for providing such comprehensive and incisive insights into the subject.

1.5 The Secretariat believes that documents Inf. 5.3 and Inf. 5.4 are of great significance in this issue and provide the necessary basis for the establishment of new procedures for the control of the raw ivory trade. It feels strongly that the draft resolution in Annex 1 of document Doc. 5.22 should be considered in the light of these two reports.

2. THE ROLE OF THE SECRETARIAT

2.1 It has been implicit throughout discussions of the subject that the Secretariat would be required to play a central role in the co-ordination of ivory trade controls. The African Seminar resolution and the draft resolution in document Doc. 5.22 both call for the Secretariat to adopt such a role. Therefore, the Secretariat drafted a provisional project outline proposing the establishment and operation of a special unit within the CITES Secretariat to co-ordinate the worldwide control of trade in raw ivory.

2.2 The overall objective of the project is:

> To ensure the long-term conservation and sustainable utilization of the African elephant by bringing the world trade in raw ivory under proper CITES controls so that, as far as possible, legitimate trade is facilitated and illicit trade is eliminated.

2.3 The sub-objectives of the project are:

i) To establish and co-ordinate the operation of a globally accepted ivory trade control system based on export quotas.

ii) To assist and advise governments in the implementation of ivory trade controls particularly in the annual establishment of export quotas, the authentication of documentation, enforcement and control mechanisms and monitoring of the trade and the status of elephant populations.

iii) To assist and advise traders and trade associations in complying with the ivory trade control procedures.

2.4 The project will involve employing one full-time professional and one full-time clerk/typist. In addition, WTMU will be contracted to handle the necessary data-processing. The professional ("Ivory Controls Co-ordinator") will be responsible for ensuring that the procedures established by the Conference of the Parties are effectively implemented and properly co-ordinated in accordance with the relevant resolution(s).

2.5 At the time of writing of this document, the Secretariat had already received (from the Ivory Division of the Japanese General Merchandise Importers' Association via World Wildlife Fund - Japan) a firm commitment for 60% of the funds needed to fully establish the unit. It is hoped and anticipated that the balance will be available from other sources.

2.6 The need for such a unit cannot be over-emphasized and is amply demonstrated in documents Inf. 5.3 and Inf. 5.4. In particular, both those documents repeatedly confirm that a very large proportion of the international trade has been conducted without proper CITES controls either at the exporting end or at the importing end or at both ends.

2.7 In addition to its primary function, the ivory unit could also be responsible for further investigating the idea of forming an "Ivory Producers Export Cartel" (IPEC) which has received support from several African Parties (see document Inf. 5.3). Furthermore, the Secretariat envisages that the ivory unit would also investigate methods of securing permanent sources of funding so that the unit itself becomes effectively self-financing within three years.

2.8 In order for the proposed export quota system and new control procedures to come into effect on 1 January 1986, it is essential that the ivory unit becomes operational no later than September 1985. This will enable the professional officer to spend the first three months making the necessary administrative preparations, establishing effective lines of communication and ensuring that the quotas established by the Parties and procedures are prepared by 1 December 1985. Therefore, the Secretariat proposes that recruitment procedures will be initiated immediately following this meeting of the Conference of the Parties.

3. TRADE CONTROL PROCEDURES

3.1 The Secretariat believes that it would be extremely valuable for the Parties involved in the raw ivory trade to have a short manual or "guidelines" on the operation of the quota system and on the enforcement of the associated control procedures. Therefore, it feels that such a manual should be prepared as soon as possible and at least before the end of 1985. It intends to proceed with this idea if the Parties agree and a suitable amendment to the draft resolution is provided below. Such "guidelines" would provide the Parties with practical descriptions of how the resolution might be most effectively implemented.

3.2 However, there are certain aspects of the control procedures which need to be explicity agreed and which the Secretariat believes to be essential to the success of the whole proposal. These procedures are not designed and will not be used by the Secretariat to regulate the trade. They are specifically for two purposes:

a) to ensure that importing countries do not accept shipments of ivory that have not been exported from the country of origin under proper CITES controls, i.e. exported against the wishes of the Management Authority of the exporting country; and

b) to provide an accurate means of monitoring the trade and thus provide feedback of data into the export quota system.

The procedures are the following:

i) Every time that the Management Authority of an exporting country authorizes the export of a shipment of raw ivory it must notify the Secretariat of the weight, number of tusks, permit number and destination immediately. A copy of the permit and full details of each tusk number should also be mailed to the Secretariat at the time of issue or when the shipment is cleared for export.

ii) Upon receipt of this information, the Secretariat will inform both countries involved. Upon clearing any shipment, the Management Authority of the importing country must notify the Secretariat.

iii) If an importing country has not been informed by the Management Authority of the exporting country and/or the Secretariat that a shipment has been authorized for export it must not allow importation until the Secretariat has been consulted and has notified the Management Authority that the exporting country has permitted the shipment in accordance with the quota system.

iv) Imports from a re-exporting country must be allowed only when full CITES documentation is available, including tusk numbers, and when adequate documentation is available to satisfy the Management Authority that the ivory was either exported under the quota system or was registered with a Management Authority prior to 31 December 1985. Although such trade need not be subject to the strict controls described in i), ii) and iii) above, any Management Authority should seek the advice of the Secretariat if there is the slightest doubt about a shipment.

v) Any confiscated ivory which is not included in a quota, including any such ivory confiscated in a country not having a quota, should not be allowed for export or re-export until the Secretariat has been notified. Any such notification should include full details of the shipment. Thereafter, its export or initial re-export should be subject to the same procedures as described in i), ii) and iii) above.

3.3 These procedures are designed to ensure that the ivory unit of the Secretariat has complete details of all whole tusks, or substantially whole tusks, when they first enter international trade. Without such information, the Secretariat would be unable to properly monitor controls and the quota system would not be effective.

3.4 The large volume of data (initially involving at least 50,000 tusks per year) will be processed by WTMU on a computer and will then be available for use in adjusting quotas, revising management programmes, etc., etc.

3.5 With respect to the marking of tusks, several problems have been raised and discussed in document Inf. 5.3. The Secretariat strongly believes that this matter requires a practical solution, which may differ according to national requirements and/or constraints. Therefore, the Secretariat recommends some flexibility in this and feels that the best solution would be for the ivory unit to co-ordinate information on how countries are marking tusks or will be able to mark tusks and that, providing any marking system complies with the principle of Resolution Conf. 3.12 it should be accepted. This is one area where the above-mentioned "guidelines" would be of considerable use. Therefore, appropriate amendments to the draft resolution are provided below.

4. SUGGESTED AMENDMENTS TO DRAFT RESOLUTION

4.1 The Secretariat recommends the following amendments to the draft resolution in Annex 1 to document Doc. 5.22:

i) add to recommendation d) after "1 January of each year," preparing and distributing for the guidance of the Parties (and non-Parties) a practical manual describing the most effective procedures for implementing this Resolution,

ii) in recommendation f), replace "or recommendation 1) below" with: or in accordance with the Secretariat manual referred to in recommendation d) above.

5. CONCLUSIONS

5.1 The Secretariat believes that the reports contained in documents Inf. 5.3 and Inf. 5.4 form an excellent basis on which to establish proper control of the international trade in raw ivory in conjunction with the draft resolution (with some revision of detail) in Annex 1 of document Doc. 5.22.

5.2 Therefore, the Secretariat seeks the approval of the Conference of the Parties for the establishment of the ivory unit, referred to above, on the basis described in this document. The Secretariat also requests that the Conference of the Parties approves the contents of this document as a working basis for the implementation of the CITES controls of the raw ivory trade.

APPENDIX 12

DEMONSTRATION QUOTA FOR ZIMBABWE - 1985

Forms Q1 and Q2 have been used to set a hypothetical quota for Zimbabwe in 1985. The following notes apply.

1. Zimbabwe does not in fact have a 1 kg limit on weight of tusks for export. This has been included simply for demonstration purposes.

2. The very large numbers destined to be culled **(Box C)** are part of a programme to reduce Zimbabwe's total number of elephants to 33 000 over the next few years.

3. The category **CROPPING** covers animals which will be used to ration labour gangs and provide staff training.

4. The **SPORT HUNTING** quotas may appear slightly high for the populations in the areas they originate (they form less than 1% for the country as a whole). These quotas include, in addition to trophy bulls, a certain number of non-trophy bulls (tusks less than 10 kg each), and trophy cows.

5. The percentage offtake from the population appears high because of the culling total. Removing the amount culled, the offtake is 2.8% of 40 000 animals, which is well within the capability of the population to sustain.

6. The various factors used on the lower part of Form Q1 are very much experimental at this stage: we will be able to assess them better at the end of 1985.

ESTIMATE OF IVORY PRODUCTION AND EXPORT QUOTA

FORM Q1: ESTIMATE OF ANIMALS DYING IN QUOTA YEAR

COUNTRY ZIMBABWE YEAR 1985 SHEET 1 OF 1

Minimum export weight of tusk (if any) 1 Kg.

AREA OF ORIGIN	POPULATION ESTIMATE	CAUSE OF DEATH: NATURAL	MANAGEMENT				ILLEGAL	TOTAL DYING
		NATURAL MORTALITY	CULLING	CROPPING	SPORT HUNTING	CONTROL HUNTING	ILLEGAL HUNTING	
SUB-TOTAL FROM PREVIOUS SHEETS		1 %						
1 HWANGE N.P.	16700	167	4000	30	—	100	10	4307
2								
3 MATETSI	4000	40	—	—	36	10	5	91
4 COMPLEX								
5								
6 CHETE	800	8	—	—	11	—	3	22
7 SAFARI AREA								
8								
9 CHIRISA	1800	18	250	5	12	—	5	290
10 SAFARI AREA								
11								
12 CHIZARIRA N.P.	1800	18	250	5	—	—	5	278
13								
14 MATUSADONA N.P.	1300	13	100	5	—	—	5	123
15								
16 REMAINDER OF	3600	36	—	—	68	50	25	179
17 SEBUNGWE								
18								
19 ZAMBESI	11000	110	1400	15	110	—	30	1665
20 VALLEY								
21								
22 GONA RE ZHOU	4000	40	1000	10	—	—	20	107
23								
24 REMAINDER	2000	20	—	—	57	40	50	167
25 OF ZIMBABWE								
TOTALS	A 47000	B 470	C 7000	D 70	E 294	F 200	G 158	H 8194

FINAL PAGE ONLY — % of population dying in quota year (100 × H/A): 17.4

Finding Factor	0.3					0.5	
DEATHS OFFICIALLY RECORDED	I 141	C 7000	D 70	E 294	F 200	J 79	K 7784
Factor: no. with tusks	0.7	0.85	1.0		1.0	0.9	
ANIMALS BEARING TUSKS	L 99	M 5950	N 70	E 294	O 200	P 71	Q 6684
Factor: no. tusks/animal	←			1.9			→
TOTAL NO. OF TUSKS	R 188	S 11305	T 133	U 559	V 380	W 135	X 12700
Factor: no. tusks > limit	0.6	0.67	1.0		1.0	0.9	
NO. TUSKS ABOVE LIMIT	113	7574	133	559	380	122	Y 8881

NO. TUSKS BELOW LIMIT Z 3819

Totals from boxes X, Y, Z are carried forward to Form 2.

ESTIMATE OF IVORY PRODUCTION AND EXPORT QUOTA

FORM Q2: ESTIMATE OF EXPORT IVORY QUOTA

COUNTRY ZIMBABWE YEAR 1985

Minimum export weight of tusk (if any) [1] Kg.

	BELOW LIMIT		ABOVE LIMIT		TOTAL
TOTAL TUSKS ORIGINATING FROM AREAS WITHIN COUNTRY Carried forward from Form Q1	z 3819	+	y 8881	=	x 12700
ESTIMATE OF CONFISCATED IVORY ORIGINATING WITHIN COUNTRY	a 10	+	b 100	=	c 110
ESTIMATE OF CONFISCATED IVORY ORIGINATING IN OTHER COUNTRIES WHICH WILL NOT BE REPATRIATED	d 20	+	e 200	=	f 220
IVORY HELD FROM PREVIOUS YEAR 1. GOVERNMENT STOCKS	g 100	+	h 200	=	j 300
2. PRIVATE DEALERS	k 300	+	l 200	=	m 500
3. PROVISION FOR PERSONAL EFFECTS EXPORTS BY PRIVATE CITIZENS	n —	+	o 20	=	p 20
TOTAL TUSKS IN YEAR OF QUOTA	q 4249	+	r 9601	=	ε 13850
			−		
TOTAL TUSKS CONSUMED INTERNALLY	q 4249	+	t 601	=	u 4850
			=		
TOTAL TUSKS FOR EXPORT			v 9000		QUOTA
			−		
LESS: NUMBER OF TROPHY TUSKS SPORT HUNTING. Box U on Form Q1 PERSONAL EFFECTS. Box p this form			w 579		
			=		
NET NUMBER OF TUSKS ENTERING TRADE			x 8421		

APPENDIX 13

IVORY PRODUCERS EXPORT CARTEL (IPEC)

The following is a possible structure for a cartel to export ivory for the ivory producing countries. The need for such an organisation arises from the extremely disparate prices being paid for ivory exported from the different countries in Africa. Many countries are not obtaining the full value of the resource for their governments. In the coming years, as ivory becomes scarcer, the cartel could greatly benefit producer countries by ensuring that the price of ivory stays high and that the commodity is marketed to best advantage.

Africa needs to be seen to market its own product efficiently, police its own industry, and service its own industry technically. At present the international conservation community has taken it upon itself to assume a large part of the responsibility for conserving African elephant. The need for this would decrease if African countries were able to demonstrate effectively that elephant were under sound management and conservation of the species was ensured.

Dr. G.F.T. Child (Director, Department of National Parks and Wildlife Management, Zimbabwe) has already had preliminary discussions on the subject of co-ordination of the marketing of wildlife products amongst producer countries in Africa, and has considered a larger organisation than that discussed in this Appendix. This is not intended to conflict with any other moves being made at present to improve the marketing of wildlife products, but should be regarded as one possible option which pertains strictly to raw ivory only.

The cartel should be a small agency **employed** by the ivory producing countries. It should not be an organisation comprised of civil servants seconded by the participating countries, and as far as possible it should be free of the bureaucratic procedures and political involvements which hamper attempts by African countries to embark upon joint ventures.

The first requirement for the establishment of IPEC is the formation of a board on which producer countries would be represented. The board itself is not IPEC: it is simply the "employers' organisation" controlling the cartel.

THE BOARD

This would consist of no more than two representatives from the government of each participating country: the highest presiding wildlife officer, and a representative of the Treasury or appropriate Ministry controlling finance (wildlife officers are notoriously poor in their grasp of financial and economic issues).

The board would have the following functions:

a) To propose and vote on policies which IPEC should follow.

b) To recruit and dismiss the staff of IPEC.

The constitution of the Board would have to address the following:

a) Frequency of meetings. These need not be often, perhaps once a year at same venue as CITES meetings.

b) The voting system. A dual system would probably be necessary: on financial matters votes would be in proportion to ivory exports; on matters such as recruiting each country could exercise an equal vote.

c) Rules respecting the sovereignty of nations.

d) Rules for the chairmanship.

e) Conditions of entry to the cartel and conditions for dropping out of the cartel. Most cartels work on the principle that it costs little to join but is extremely expensive to leave.

IPEC

The cartel staff

A small agency is envisaged which has no more than about 10 members of staff with the specific functions described below. Very high salaries would be offered to ensure that the cartel has the best available staff.

a) Director

- whose role is to carry out the policy of the Board, represent the cartel at Board meetings and present an annual report, to administer the staff of the cartel, and generate internal policy for IPEC.

b) Marketing (2 persons)

- the sole function of the marketing staff is to sell ivory to best advantage. They have no conservation role, and accept all ivory for sale regardless of any feeling they may have about its origins.

c) Investigations (2 persons)

- these should be experienced detectives who would collect information on irregularities in the ivory trade. They would have no powers of arrest but would pass their information to the police forces in the countries concerned.

d) Technical (2 persons)

- these would be ecologists who would address the long term husbandry of elephant. Their main functions would be the inventory of elephant (population census), advising on management programmes for elephant where required, and modelling the effects of management strategies on populations. Their work would be strictly applied, as opposed to academic. While the marketing and investigations staff would be more concerned with short term issues, the technical staff would be expected to look at the long term future of elephant.

The cartel would also require an accountant, a secretary, and an office hand. Services of specialists, such as field management experts, air survey teams, or economic consultants would be hired as and when required.

Recruitment of staff

The 7 senior members of staff could be recruited as follows:

a) A detailed description of the posts would be advertised throughout the world.

b) Applicants would submit curriculum vitae stating their experience, and would state their salary and fringe benefit requirements.

c) At a full Board meeting each of the member countries would rank the applicants for the posts in an order of priority, and those preferred by the most countries would be the successful applicants.

d) Interviews would be conducted of a short list of final selections.

Location of Headquarters for IPEC

This would be best decided by an independent consultant, who would take into account such factors as cost of living, travel logistics, foreign exchange restrictions, communication facilities and working environment.

Funding of IPEC

IPEC could be funded by a 1% levy on the total amount of sales it makes. If the world export trade in ivory is of the order of 50 -100 million US dollars, such a levy would provide more than enough funding. The cartel could run a revolving fund where the balance of the 1% levy is invested for the producer countries to provide dividends or be used for conservation purposes.

Methods of selling ivory

The marketing staff would export all ivory from member countries. It would be impractical to move ivory to a central point, and so the cartel staff would travel to countries to do inventories of stocks of ivory, and would rely on good communication facilities to keep records updated.

Sales to consumer countries would generally be by negotiation of the highest price possible. Cartels work on the basis that while stocks are withheld from the market prices rise, but no money is made. When the commodity is sold, profits are realised but if selling continues for too long prices fall. The optimum is to achieve a rate of feed to the market which keeps the prices high and generates steady revenue.

The cartel might also consider inviting international buyers to attend auctions in Africa. The auctions could be rotated among the producer countries.

All countries would be advised of the daily price of ivory much as the exchange rates for foreign currencies are advised at present. Internal sales of ivory to domestic carving industries could be based on this price with discounts at the discretion of the governments of the participating countries.

Ivory would only move on a CITES permit issued by IPEC. No other permits would be valid. Such movements would occur only when a sale had been concluded with an importing country.

The role of private dealers requires examination. Either all private dealing in ivory would be banned by governments, or dealers would operate under severely reduced latitude. If the cartel is successful in raising world prices of ivory dealers could gain from the situation. The role of dealers would become much as that of diamond merchants in the world today: the initial sale would be from the cartel, but thereafter the dealers would take over the intermediate market before ivory is finally carved.

Implications for the illegal trade

Penalties for possession, as with diamonds, would be very high. The illegal export of ivory should become far more difficult if sufficient countries join the cartel, and if consumer countries purchase only from the cartel.

However, the cartel would be vulnerable insofar as its attempts to keep the price of ivory high will obviously be to the advantage of any illegal operators selling at a slightly lower price. The greatest factor in favour of the cartel is that if the demand for ivory remains as high as it is at the moment, the cartel will still find itself able to sell all its ivory at a high price, notwithstanding an illegal market which has to sell at a lower price. If the cartel is successful it will lead governments to take more severe steps to curtail the illegal trade.

Relation to the quota system

The technical staff of IPEC would assist countries in setting quotas and managing their elephant populations within stated quotas. Ultimately the quota system should give stability to the ivory market.

APPENDIX 14

LEGALISED POACHING

This proposal seeks to address two problems which confront several countries in Africa.

a) Governments need to establish control over the de facto hunting at a district level within their countries. At present there are no wildlife utilisation policies, yet a very large amount of illegal hunting is taking place. Hunting bans are unsuccessful.

b) The value of the product being hunted is too low at the district and national levels. The hunter sells his ivory at less than US $10/kg to the district dealer, who sells it for less than US $20/kg to the urban dealer, who exports it for no more than US $30/kg. This ivory is worth US $75 when it reaches Hong Kong. The need is to elevate the price at source. The hunter should be receiving half of the final price and the middle men should be taking smaller profits.

This is not the first time a proposal of this sort has been presented. Parker (1983, page 20) describes how he and several other wardens of the Kenya Game Department petitioned the Government to attempt a scheme for the Wata hunters in Kenya thirty years ago. The colonial Government frustrated their attempts. Richard Bell (pers. comm. and 1985c) has advocated the principle in correspondence with Richard Barnes and in print. The proposal presented here contains ideas that originated from discussions with the Zaire wildlife authorities.

1. Any agency attempting to implement the scheme should get clearance at a high level within its government. When the wildlife authorities try to enforce the provisions of the proposal they must be assured of the full backing of government - even to the extent of confrontations with senior politicians.

2. The wildlife agency will set a quota of animals which can be hunted without detriment to the elephant population in a particular area. The area should be no larger than can be conveniently hunted by a single hunter or group of hunters, and the quota should not exceed about 0.5% of the elephant population in that area. Several such areas might be designated.

3. An active poacher, who must be a resident of the area, should be identified and approached with the proposal. The best time to do this is when he has been captured and is in jail.

4. He will be given the proposition of having the monopoly on a legal quota of male elephant in the defined area subject to certain conditions. The conditions follow.

5. The quota will not be given free of charge. It will do nothing to improve the value of the product at source, and there would be a certain amount of social injustice in suddenly making him resource-rich in the midst of an impoverished community. Safari operators would attack government claiming that they could make more foreign exchange from the quota than the local hunter. Government should also perhaps have a share in the resource. **THE SOLUTION IS THAT HE WILL GIVE ONE TUSK OF EVERY ANIMAL KILLED TO THE GOVERNMENT.** This will be the tusk that touches the ground first.

6. He will be responsible for dealing with all crop-raiding elephant before he shoots animals further afield. If government receives complaints from the villagers about crop-raiding his permit will be in jeopardy.

7. He will protect his hunting area from all other illegal hunters. Where the government agency is in a position to enforce the law, he will report all illegal deaths and rely mainly on the authorities to deal with the problem, particularly in the case of large gangs armed with military weapons. Where the law enforcement agency is unable to respond he will be permitted to take matters into his own hands. He must report all illegally killed elephant in his area, and any carcases found which have not been reported will deducted from his quota.

8. If there are safari hunters operating in his area, he will shoot only those males which have tusks in the range 10 - 20 kg. This is to avoid conflict with the sport hunting industry who require the larger tusks.

9. He will present both tusks to the authorities as soon as possible after the elephant has been killed. Both tusks will be registered and stamped with the correct district code, and he will be given an ownership certificate for one tusk.

This is an elegant solution so far. It fits in with the traditional hunting rules, where the chief always received one tusk from the hunters in his community, who were regarded as a select guild. It provides a legitimate supply of ivory to the private citizen, and ensures a supply of government ivory. It solves the crop raiding problem, and is using a territorial and economic imperative to keep illegal hunters out. If the hunter decides to exceed his quota he is a marked man - government knows exactly where to begin investigations.

It doesn't, however, solve the problem of raising the value of the product at source. When the hunter walks out of the district office with his one legal tusk clutched in his hand he is going to sell it to the good old nearby dealer at the rockbottom price he has always received. And here is where government plays its second masterstroke.

10. **GOVERNMENT OFFERS TO BUY THE SECOND TUSK FROM THE HUNTER** - at a price which is slightly higher than the local dealer's price. For government this is sound business: it cannot lose as long as the international price is well above the price the hunter is used to receiving. However, it is not really the objective of government to purchase all the hunter's tusks: government simply wishes to force the local dealer to pay more.

11. Government is keen to see the local carving industry prosper, and wants to establish a legitimate supply of tusks for the industry. If it doesn't the tusks will be obtained illegally. It may have to buy a number of tusks from the local hunter in the course of forcing the market value upwards, but this is not important. Once raw ivory is worth US $50/kg government can sit back and be pleased with itself. A number of dealers and carvers may be put out of business but this is inevitable. The resource cannot stand the present harvesting levels, and some form of selection process has to winnow out the less successful.

12. Once these initial steps have been put into effect a whole new vista opens up. The dealers, carvers and ivory sellers can be registered over a period of time. Government has a foot in the door of the illegal trade, and through the hunter has access to all parts of the industry. It is far easier to ask the legal hunter "to whom did you sell your tusk?" than it is to say to the man in the street selling worked ivory "where did you get your tusk?" The illegal operators can be put out of business fairly easily.

13. The full value of the elephant carcases can now be realised. The skin can be recovered and the meat marketed within the community. There is no need for carcases to rot in the bush.

14. It may appear that the hunter is getting the chief benefits from the scheme. This is not necessarily so. He will distribute his largesse within his community. He may be forced to pay other people in the village to help him deal with poachers in his territory. The legality of the operation will lead to all sorts of secondary industries in the community. The increased value of ivory in the district means that far fewer elephant need to be killed for the same income that they were providing before the scheme.

15. Ultimately the hunter will join with government in the management of the resource. The wildlife authorities will listen to his assessment of numbers of elephant in the district and adjust quotas accordingly. If the scheme is successful with elephant it can be extended to other species. By sharing its monopoly on the wildlife resource, government may engender a responsible husbandry of elephant which it has not been able to do so far.

THE WORLD TRADE IN RAW IVORY, 1983 AND 1984

A Report Prepared for the CITES Secretariat

by

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CONTENTS

INTRODUCTION

This report was produced by the staff of the Wildlife Trade Monitoring Unit of IUCN's Conservation Monitoring Centre, under contract to the CITES Secretariat. It is one of two reports produced at the Secretariat's request to provide background information for a proposal to establish better controls on the international ivory trade. Integral to these controls is the establishment of quotas for export of raw ivory from each African country with an exploitable population of African elephants (Loxodonta africana). The other report to the Secretariat considers the biological status of the elephant and explores possible quotas based on the status information. The present report complements the other by examining the scale and pattern of the world trade in raw African ivory, and presenting data on the average weight of tusks in trade.

Our primary aim was to provide the most up to date information on the extent of raw ivory exports from each African country; the analysis, carried out by J. Caldwell, appears in Section 1 of the Results. For some African countries there were no export data or so few that it was necessary to estimate exports on the basis of data from importing countries. These have also provided a valuable check even when export statistics were available. Our analysis of the data of importing countries appears in Section 2 of the Results, that for Hong Kong and Japan being carried out by J. Caldwell and the remainder by J. Barzdo. The discussion, which contains a new analysis of average tusk weight, was written by both authors, who are grateful to T.P. Inskipp and A.M. Dixon for their assistance in the production of the report, and to the CITES Secretariat, R.B. Martin, G. Hemley and D. Fuller (TRAFFIC USA), Tom Milliken (TRAFFIC Japan), J-P. d'Huart (TRAFFIC Belgium), and T. Friedlein for their assistance in gathering data.

METHODS

In December 1984, the CITES Secretariat requested the Management Authorities of African Parties and a number of important ivory importing countries to provide information on the exports/ re-exports and imports of raw ivory for the years 1983 and 1984. Mr Rowan Martin, during his study mission in Africa, collected much information on trade and passed it on to us. At the beginning of February 1985 WTMU wrote to the CITES Management Authorities of all those countries from whom we had not received a response.

As a result of all this we received some data from the following countries, to whom we are indebted: Belgium, Benin, Burkina Faso, Cameroon, Central African Republic, Chad, Congo, Ethiopia, Gabon, Ghana, Hong Kong, Japan, Liberia, Mozambique, Namibia, Rwanda, Senegal, Somalia, South Africa, Sudan, Tanzania, Togo, Uganda, UK, Zaire, Zambia and Zimbabwe. The data from Hong Kong are worthy of particular mention because they are of outstanding quality and are complete, for both years, with tusk weight, number of tusks and export permit numbers. The data received from each country are referred to in the relevant section of the Results.

We have also examined published Customs statistics of a large number of countries, but unfortunately very few countries include a category for elephant ivory or tusks alone. Those which were useful were from Japan, Kenya, Sudan, Taiwan, Thailand, and USA.

In addition we have undertaken discussions with ivory traders in Europe and have found their help and their trade statistics to be extremely useful.

In general our methods have been the same as those employed in our previous report to CITES on the ivory trade (Doc.TEC.1.4) (Caldwell, 1984; Barzdo, 1984) which should be consulted. We have made much use of CITES annual report statistics for 1983, particularly in consideration of the importing countries. However, the differing quality of the available reports and the complex nature of the trade have precluded a uniform approach in dealing with each country. However we believe that the presentation of the data makes the methods more or less clear in each case. In relating tusk numbers to numbers of elephants we have again used the correction factor of 1.88 tusks per elephant, from Parker and Martin (1982) unless otherwise stated.

RESULTS

Section 1

EXPORTING COUNTRIES

WEST AFRICA

BENIN

The CITES Management Authority of Benin informed the CITES Secretariat that the country's legislation regarding CITES was not yet functioning to the point where it was possible to provide statistics concerning ivory trade. Moreover, there is no record of trade emanating from this country.

BURKINA FASO

Information from the Directeur des Parcs Nationaux des Reserves de Faune et des Chasses states that there is no commercial ivory trade in Burkina. There is a very small trade in carved ivory in local markets.

GHANA

The Department of Game and Wildlife reports that nine carvings were exported in 1983, of these only two represented substantially whole tusks. In 1984 the figures were seven substantially whole tusks and 12 carvings.

GUINEA

There is no indication that any raw ivory originating in Guinea is in international trade.

IVORY COAST

No raw ivory from the Ivory Coast is reported in international trade, indeed that country imports tusks in order to support its local ivory carving industry. It is however possible that some of the trophies exported from Senegal originated in the Ivory Coast. Information has been received by WTMU however, that suggests that the Ivory Coast may have re-exported some raw tusks to Europe during 1984 (Friedlein, pers comm).

LIBERIA

The CITES Management Authority of Liberia has informed the CITES Secretariat that there has been no ivory trade there for the past two years. It has also been reported, but not confirmed, that Liberia banned export of ivory or any parts or derivatives of forest elephants in May 1984.

MALI

No information concerning the ivory trade was received from Mali but since all hunting has been banned there since 1978 there should be no exports of raw ivory. Information has been received by the CITES Secretariat however that a trader in Hong Kong applied to import ivory from Mali in 1984.

MAURITANIA

There is no indication that any ivory from Mauritania is traded commercially. Martin (1985) believes that country's elephant population to be extinct.

NIGER

No raw ivory from Niger is reported in international trade.

NIGERIA

No raw ivory from Nigeria is reported in international trade.

SENEGAL

The CITES Management Authority of Senegal reports a total export of 11 tusks to France during 1983 and 1984. It is unclear whether these were of Senegal origin and some at least may have come from Cameroon and the Ivory Coast.

SIERRA LEONE

There is no evidence that any raw ivory from Sierra Leone is currently in international trade. The UK Customs seized a tusk reported to be of Sierra Leone origin that was being imported from France in 1983.

TOGO

The CITES Management Authority of Togo reports eight tusks exported to Canada, F.R.Germany and France in 1983 and 12 tusks exported to Switzerland and France in 1984.

CENTRAL AFRICA

CAMEROON

The Direction de la Faune et des Parcs Nationaux has indicated that exports in 1983 amounted to 33 tusks, and in 1984 to 34 tusks. These trophies went mainly to destinations in Europe and North America.

Dr Martin reports that there are about 400 tusks in the Yaounde ivory store awaiting sale, and possibly another 200 tusks in the provinces.

CENTRAL AFRICAN REPUBLIC

According to figures received from the CAR Management Authority and from Froment (1984), exports of raw ivory decreased from 201 712 kg in 1982 to 101 410 kg in 1983, and then again to 42 336 kg in 1984. The number of tusks was not recorded in 1982 but mean tusk weights were calculated to be 11.7 kg and 14.6 kg in 1983 and 1984 respectively. At the CITES Training Seminar for African Parties, held in Brussels in June 1984, representatives from CAR stated that an attempt was being made to reduce the level of ivory exports.

The large volume of ivory exported in 1982 did not all reach markets in the Far East during that year, Hong Kong and Japan only reporting imports of 110 t, some of which may have been originally exported in 1981. It is reasonable to assume, therefore that at least 100 t, and possibly more was either in store in Europe, or in transit, at the end of 1982. This 'reservoir' of ivory from CAR has had a knock-on effect on the annual statistics reported by Hong Kong and Japan particularly, and has distorted the overall picture of annual ivory exports from Africa. For example, Japanese Customs statistics for 1984 record imports of over 100 t of ivory of CAR origin despite CAR's reported exports of only 42 t in that year. A closer inspection of the available CITES data from Hong Kong, Japan and Belgium suggests that a large proportion of this ivory (in excess of 60 t) was re-exported by Belgium to the Far East in late 1983.

Belgium was reported by CAR to be the destination of the majority of the exports in 1983 and 1984, and it is likely that this was the case in 1982 also. The data for 1984 compare well with those for imports from CAR provided by Belgium - CAR reported exporting 2102 tusks weighing a total of 32 187 kg and Belgium reported importing 2316 tusks weighing 36 660 kg, the difference between the totals almost certainly being the result of end-of-year exports not being reported as imports until the following year. For example, of the 22 shipments arriving in Belgium from CAR in 1984, at least five left CAR in 1983, and at least one of CAR's 17 shipments to Belgium in 1984 would not have arrived until early 1985.

CAR exported 1122 tusks weighing 11 981 kg directly to Hong Kong, 102 tusks weighing 1648 kg to Italy and a small quantity, 12 tusks weighing 200 kg, to Japan in 1983. In 1984 the trade pattern changed slightly, no exports going directly to Hong Kong and small quantities, 29 and 15 tusks respectively going to Portugal and Gabon. However, 566 tusks weighing 7320 kg were exported directly to Japan and another 176 tusks weighing 2060 kg were exported to Singapore, probably in transit to Japan. This may suggest that ivory traders were beginning to use Singapore as a transit point, perhaps as a result of Belgium implementing CITES, and the airline Sabena refusing to carry ivory.

CAR also exports ivory confiscated from poachers, and this may be recorded as being of CAR origin by the importer. However, at least two of the shipments reported by CAR as direct exports in 1984 were in fact re-exports of ivory originating in Zaire, and were reported as such by Belgium.

CHAD

Large amounts of ivory left Chad illegally in 1983, according to official sources in that country (R. Martin, in litt.). However, official government statistics indicate that legitimate exports in 1983 were 1723 tusks weighing 10 564 kg. Hong Kong reported importing 11 shipments of tusks amounting to 25 335 kg directly from Chad in 1983, and another 5641 kg from Japan, which had imported them that year from Chad via Belgium. Total exports from Chad in 1983 would therefore appear to have been at least 31 t, although a proportion of this may have left Chad in 1982. Japanese Customs data record a little over 22 t of ivory of Chad origin being imported in 1983 but over 15 t of this was via Hong Kong.

A total of 498 tusks weighing 3694 kg were officially exported from Chad in 1984. However, information provided by the ivory trade indicates that one trader alone imported 1263 tusks, weighing 4564 kg, in 1984. Hong Kong reported importing one shipment of 447 tusks (1533 kg) directly from Chad in January 1984, two shipments via Belgium containing 581 tusks (2544 kg) in September 1984, and four shipments via Japan containing 684 tusks (2183 kg). It is possible however that the imports from Japan may have contained ivory shipped from Hong Kong to Japan in 1983.

Japanese Customs statistics for 1984 record a total import of 3156 kg of ivory of Chad origin, however inspection of Japanese and Hong Kong CITES statistics reveal that only 410 kg of this came directly from Chad, the remainder being re-exports from Hong Kong.

The total amount of ivory reaching markets in the Far East that was exported from Chad in 1984 appears to have been at least 4.5 t, but considerably less than the previous year. It is likely that the mean tusk weight was 4 kg or less.

CONGO

Information from Congo indicates that 12 701 kg of raw ivory was exported in 1983, the destination being France. However, 11 of the 12 shipments reported as exports were reported by Japan as coming directly from Congo so it would appear that they only went through France in transit. The total comprised 902 tusks averaging 14.08 kg each, and suggests that 480 elephants were involved.

Imports of ivory directly from Congo reported by Japan in 1983 compare well with Congo's reported exports. Japan's figure for these imports being 14 412 kg, the difference from the figure reported by Congo being caused by end-of-year shipments. In addition to these however, Japan reported importing another 16 070 kg of "Congo" ivory via Belgium and 2797 kg via Hong Kong. Thus of the 33280 kg of ivory reported to be of Congo origin, only 43% can be attributable to legitimate exports from the country of origin during 1983. Unfortunately it is not possible to estimate how much of this ivory was exported in 1982 and how much represents illegal trade not recorded by the Congo CITES Management Authority.

In 1984 Congo reported exporting 20 457 kg of raw ivory, 1275 tusks with an average weight of 16 kg, and again France was reported to be the main destination. One shipment of 1586 kg, 108 tusks averaging 14.7 kg, was reported as going to the Ivory Coast.

In the first six months of 1984 Japan reported four shipments directly from Congo, but only three had a Congo export permit number. It is likely that the fourth shipment was incorrectly ascribed to Congo and was more probably ivory of Zaire origin re-exported by Burundi. All three 'legitimate' shipments were also reported as exports by Congo but there were some interesting discrepancies between the details reported on export and those reported on import. Congo permit no. 16/84 was apparently issued for 189 tusks weighing 3012 kg, but an import of 191 tusks weighing 3189 kg was reported by Japan. Permit no. 30/84 was issued for 259 tusks weighing 4116 kg, and although an identical weight was recorded on import, the tusk number had increased to 272. Permit no. 32/84 was issued for 98 tusks weighing 2035 kg but according to Japanese data the shipment consisted of 312 tusks weighing 2095 kg. The same shipping agents were involved in each case. During 1984 France seized one shipment of ivory from Congo destined for Japan because the number of tusks in the shipment far exceeded the number specified on the permit. The original permit was issued for 203 tusks weighing 3640 kg but the shipment was actually composed of 713 tusks weighing 3863 kg.

These differences make it very difficult to provide accurate estimates of the number of elephants involved in supplying the ivory trade. If the information from the Congo CITES Management Authority is used, a total of 678 elephants with a mean tusk weight of 16 kg is obtained. However, the effect of compensating for the four shipments mentioned above is to increase the number of elephants involved to 1071 and to decrease the average tusk size to 10.4 kg. It is likely that these corrected figures still overestimate tusk size and underestimate elephant numbers.

Congo also reported exporting tusks which were almost certainly private hunting trophies. These amounted to 34 tusks in 1983 and 22 in 1984, average tusk weight being 10.4 kg.

EQUATORIAL GUINEA

No raw ivory from Equatorial Guinea has been reported in international trade.

GABON

The Directeur de la Faune et de la Chasse reports that 19 tusks were exported as trophies in 1983 and 56 in 1984. The destinations were mainly Europe with a few going to the USA.

ZAIRE

Zaire has the largest population of elephants in Africa but has a ban on export of raw ivory - CITES Notification No. 148 of 27 August 1980 informed CITES Parties of this and asked that permits from Zaire that were presented to importing Parties should be sent to the CITES Secretariat for verification. It is likely, therefore, that ivory traders importing tusks originating in Zaire will attempt to conceal the true origin of their raw ivory imports and to route shipments through non-Party states or through Party states that are prepared to issue re-export certificates. This process makes estimation of ivory production by Zaire very difficult and any such estimate should be treated with caution.

It is known that there is a high degree of poaching of elephants in Zaire (Martin, 1985) and that the ivory is moved to neighbouring countries for re-export. Burundi, Uganda, Sudan, CAR and Congo are all convenient outlets and all may have been responsible for re-exporting ivory originating in Zaire in recent years. Exports reported by Zaire in 1983 and 1984 amount to 28 trophy tusks going to Europe and North America, and one shipment of 728 tusks weighing 2077 kg that was exported illegally.

If we assume that the official exports reported by Sudan for 1983 represent only Sudanese ivory then there is in the region of another 180 t re-exported from Sudan whose origin is unknown (see section on Sudan). To simplify matters therefore, we have assumed that the origin of this ivory was Zaire. Although it is almost certain that some proportion of this was taken illegally in CAR and other countries, it is also known that exports from Congo and CAR include re-exports of ivory from Zaire.

In addition to this 180 t, Japanese Customs statistics record imports of 10 t from Burundi that is likely to have originated in Zaire, and a further import of 101 422 kg of ivory from Zaire. This latter figure is 20 t more than was reported by the CITES Management Authority, MITI, who report 80 t of ivory from Zaire imported from Belgium. The total exports from Zaire in 1983 are likely, therefore, to have been at least 270 t and may have been over 290 t, particularly if the 11 t reported by Japan as coming from Uganda actually originated in Zaire.

Japanese Customs statistics report the import of 49 827 kg of ivory from Zaire in 1984. In addition, imports of 33 118 kg are reported from Burundi and 99 320 kg from Uganda. As Uganda is unlikely to be the true origin of this latter quantity (see Uganda section) we have assumed, in order to simplify calculation, that all the ivory reported as coming from Uganda and Burundi in 1984 was originally from Zaire. Some of this ivory almost certainly originated in Tanzania and Zambia. Information from the USA suggests that 5 t of ivory were imported from Zaire. Hong Kong reports importing 450 tusks weighing 3 t from South Africa and 234 tusks weighing 3468 kg from Belgium the origin of which was reported to be Zaire. Thus exports from Zaire in 1984 can be estimated to be between 190 and 200 t.

EAST AFRICA

BURUNDI

Burundi has no wild elephant population and thus does not export raw ivory. However, the central position of the country within Africa means that it is well situated to re-export ivory from neighbouring countries such as Zaire that have large numbers of elephants. Until 1980 large amounts of ivory were re-exported from Burundi to the Far East, Hong Kong recording imports totalling over 85 t that year. However Hong Kong stopped importing from Burundi in 1981 and Japan only reported importing 2.5 t from Burundi that year, the bulk being re-exports from Hong Kong.

At this time the ivory trade began to export ivory from Africa via Sudan and thus Burundi hardly figured in international ivory trade statistics for 1982. The Sudanese ban on export of raw ivory which came into force at the end of 1983 caused ivory traders to once again look to Burundi, and Burundi Customs statistics report that at least 50 t was re-exported to Belgium that year. During 1984 the total quantity re-exported may have

been as much as 190 t and in all probability included the ivory reported by Japanese Customs to be from Zaire and Uganda. The trade route from Burundi appears to have been mainly via Belgium during 1983 but perhaps as a result of Belgium becoming party to CITES and introducing stricter control measures on the ivory trade, it appears that Singapore became the major transit point, with flights sometimes being routed via Luxembourg, Portugal or Oman.

In an attempt to prevent illegally obtained ivory leaving Burundi the CITES Secretariat issued Notification to the Parties No. 303 in July 1984 appealing to the Parties not to accept raw ivory from Singapore.

ETHIOPIA

The latest Customs statistics for Ethiopia relate to 1978. However, information from Dr Martin indicates that there was no commercial export of raw ivory in either 1983 or 1984. Export of trophies from safari hunting amounted to 128 kg during that two year period. It is further reported (R. Martin, in litt.) that the total stocks held by the Government and dealers amounts to approximately 1850 kg. However, the CITES Secretariat has received information that the Hong Kong CITES Management Authority received two applications to import ivory from Ethiopia during 1984. These were for 1188 kg and 1720 kg.

KENYA

The most recent Customs statistics available for Kenya relate to 1982 and indicate an export of 7276 kg of elephant ivory to Hong Kong. The Hong Kong CITES report for 1982 records a similar quantity of tusks and scraps imported from Kenya, with data suggesting an average tusk weight of 5.2 kg. The Japanese annual reports to CITES indicate that 2294 kg of ivory was imported from Kenya via Belgium in 1982 and a further 500 kg via Belgium in 1983. The only reported commercial trade in Kenyan ivory during 1984 was 29 tusks reported by MITI to have been imported by Japan from China, however this transaction did not appear in Japan's Customs statistics so is likely to refer to carved tusks.

RWANDA

The CITES Management Authority of Rwanda reports that four raw tusks, one worked tusk and three carvings were exported in 1983 and three raw tusks, one worked tusk and more than seven carvings were exported in 1984.

SOMALIA

Statistics from Somalia indicate that there has only been one commercial export of ivory during the last two years. This was a shipment of 1170 tusks reported to weigh 7500 kg, and was exported to Abu Dhabi in the United Arab Emirates in 1983. This shipment of Somali ivory with an average tusk weight of 6.4 kg was reported by Japan as being imported in June 1984. The only other ivory of Somali origin reported in trade appears to have been re-exports of that imported by Hong Kong in 1981 and 1982. R. Martin (in litt.) reports that there is apparently still about 40 t of ivory in store in Somalia awaiting sale.

SUDAN

Statistics from Sudan's CITES Management Authority indicate that 17 248 tusks weighing 150 100 kg were exported in 1983. The Management Authority has stated, however, that statistics on imports and re-exports of raw ivory were not recorded in either 1983 or 1984.

Analysis of the data provided by Japan and Hong Kong suggests that the amount reported by Sudan as being exported represent less than 50% of the ivory entering world markets in that year that was claimed to be of Sudanese origin. Hong Kong reported importing 260 885 kg, apparently directly from Sudan, and Japan reported importing a further 25 744 kg via Belgium. Thus it appears that at least 286 629 kg may have left Sudan during the year, although it is possible that a proportion of this represents ivory originally exported in 1982.

However, Japanese Customs data indicate that over 111 000 kg of ivory reported to be of Sudanese origin was imported - 20 000 kg more than indicated by the Japanese annual report to CITES. It is possible therefore that the amount of ivory leaving Sudan in 1983 was in excess of 306 000 kg. If the officially recorded exports of Sudanese origin amounted to 150 100 kg it would seem reasonable to assume that the other 156 000 kg was from sources outside Sudan.

The Sudan Government imposed a ban on export of raw ivory effective from 30 December 1983, however some exceptions were allowed to enable traders to ship out stock sold for export prior to the ban coming into force. Official figures indicate that 4471 tusks weighing 23 000 kg were exported in 1984.

Belgium reported re-exporting slightly over 12 000 kg of Sudanese ivory to Hong Kong and 11 000 kg to Japan in 1984. However, in the first three months of that year Japan reported importing from Belgium three shipments of Sudanese ivory totalling 7233 kg, and a further mixed shipment weighing 7957 kg which allegedly originated in Sudan and Congo. None of these shipments was reported by Belgium so it would seem likely that they were re-exported from that country in late 1983. Further, Belgium reported importing only 1872 kg from Sudan in 1984, and was therefore a net re-exporter of 21 156 kg of 'Sudanese' ivory. Thus it is likely that 30 000 kg of the estimated 50 000 kg of ivory reaching markets in the Far East in 1984 were shipped from Sudan in 1983 and should therefore be included in that year's total.

Hong Kong reported importing 3621 kg of Sudanese origin from F.R.Germany and 2139 kg from the Netherlands. Japan also reported imports of 6000 kg directly from Sudan and a further 8000 kg via Singapore. It is possible that this last shipment was one of the first to use the Singapore route after controls were tightened in Belgium and, if really of Sudan origin, it may have left Africa via Burundi.

TANZANIA

According to the Tanzanian 1982 annual report to CITES a total of 9436 kg of ivory was exported for commercial purposes. Hong Kong reported importing 5248 kg with a mean weight of 10 kg per tusk. Of the remainder, 4119 kg was reported as going to UK and 117 kg to F.R.Germany.

The following year only 781 kg was reported in the Tanzania annual report as being exported for commercial purposes:- 300 kg to UK, 442 kg to Hong Kong and 39 kg to Japan. Hong Kong reported importing 544 kg (39 tusks with a mean weight of 10.6 kg and six tusks with a mean weight of 21.7 kg) during that year, but reported importing another 2445 kg in 1984. The latter shipment left Tanzania in 1983 however, and information received from R. Martin (in litt.) suggests that the total commercial export in 1983 was 4620 kg.

No information has been received from Tanzania regarding exports during 1984, but Japanese Customs statistics record a total of 19 932 kg imported that year. Much of this ivory left Tanzania illegally and was routed through Dubai and Singapore. One shipment of 960 tusks weighing 5307 kg was seen by an officer of the CITES Secretariat in Dubai in August 1984 and the same weight is recorded in Japan's Customs statistics for that month.

In addition, Belgium reports importing 1279 kg directly from Tanzania in 1984 and the United Kingdom imported at least 5565 kg. Thus total legal and illegal exports from Tanzania in 1984 were at least 26 776 kg excluding private hunting trophies. The average weight of the tusks imported by Belgium and the United Kingdom in 1984 was 10.5 kg. If this value is applied to the total exports for that year, the number of tusks exported would have been 2563, however it is quite possible that the illegal shipments were of tusks of smaller average weight. This number of tusks represents 1363 elephants.

Private Trophy shipments

According to the Tanzanian 1982 annual report to CITES 226 tusks weighing 5071 kg were exported as private hunting trophies in that year. The mean weight of these tusks was 22.4 kg and probably represents a total of 120 elephants. The number of tusks exported in 1983 was not reported but the total weight was 5007 kg, very similar to that in 1982. If the mean weight for 1982 is used to estimate the number of tusks involved in 1983, this gives a total of 223 tusks, equivalent to 119 elephants. It would thus appear that private trophy hunters account for about 120 elephants annually in Tanzania and that the trophy tusks weigh over 20 kg each on average.

UGANDA

According to the Chief Game Warden, Uganda has a complete ban on the hunting of game animals and thus does not export raw ivory. Any ivory picked up by the National Parks Department is sold to the country's only ivory carving craft shop.

Despite this, 7891 kg of ivory, reputedly of Ugandan origin, was recorded in Japan's Customs statistics in 1982 and a further 11 799 kg was reported in 1983. No further details are available regarding the number of tusks involved or their sizes. MITI reported that 7203 kg came via Belgium in 1982 and 9796 kg in 1983 and it is possible that these shipments were the result of poaching in Uganda.

However in August 1984 the situation altered dramatically - Japan's Customs statistics for that month record the import of 20 277 kg of ivory from Uganda. This was followed by 17 706 kg in September, 18 550 kg in October and 42 787 kg in December which brought the total for the year to

99 320 kg. Martin (1985) has estimated the elephant population of Uganda to be around 2000 animals so this near 100 t is unlikely to have originated there.

In August 1984 a group of Japanese ivory importers undertook to stop importing ivory from Burundi and Zaire and it is perhaps significant that the Japanese Customs statistics show no imports from Burundi after July 1984, when 27 t were imported, but massive imports apparently from Uganda. It seems likely that the source of this ivory was the same as that previously reported as coming from Burundi and that the Sudanese ban on exports and re-exports of raw ivory had forced the trade to find new outlets.

SOUTHERN AFRICA

ANGOLA

No information has been received from Angola and the only reported trade is of eight tusks, probably hunting trophies, imported into the USA and one each by France and Switzerland in 1983.

BOTSWANA

No information has been received from Botswana, so export of raw ivory has been estimated from imports reported. In 1983 Japan imported 1222 kg of ivory from Botswana according to Customs statistics. Hong Kong reported importing 52 tusks weighing 342 kg and the UK reported importing 32 tusks weighing 444 kg. The number of tusks was not reported by Japan but the average weight of those imported by Hong Kong and the UK was 9.3 kg. The USA reported importing 315 kg and 50 tusks from Botswana in 1983.

In 1984 Hong Kong reported importing 482 tusks of Botswana origin via South Africa, the average weight being 8.5 kg per tusk. Hong Kong also reported importing tusks from the UK and Japan that originated in Botswana but it is almost certain that these were part of the 1983 imports by those countries.

It is interesting to note that if the 276 tusks imported by Hong Kong from Japan in 1984 were part of the 1222 kg imported by Japan in 1983 then their mean weight of 3.5 kg implies that only a few very large tusks were retained in Japan, and that the average weight of the tusks in the Japanese import could not have been in excess of 4.5 kg.

Thus estimated export from Botswana was about 2.5 t in 1983 and 4 t in 1984. The average tusk weight in 1984 was 8.5 kg and in 1983 was 9.3 kg if data from Hong Kong and the UK alone are used. If the Japanese import is included in the calculation the average tusk weight may have been as low as 5.3 kg in 1983.

MALAWI

No information has been received from Malawi and the only raw ivory reported in trade by importing countries was 20 tusks weighing 430 kg that Hong Kong imported and subsequently re-exported to Japan, in 1983. Martin (1985) reports that virtually all ivory in Malawi is carved locally and trade statistics confirm this.

MOZAMBIQUE

The CITES Management Authority of Mozambique has informed WTMU that there has been no commercial ivory trade in that country for the last two years. There has been one recorded export of two tusks weighing 13 kg each going to Italy as hunting trophies. However, South Africa reported exporting 14 tusks weighing 160 kg to the USA in 1984 but there is no indication as to when these tusks were imported by South Africa.

SWA/NAMIBIA

Namibia reported exporting 247 tusks weighing 1320 kg in 1983 and 688 tusks weighing 2924 kg in 1984. All but three of the tusks exported in 1984 went originally to South Africa, but it is reported that 48 weighing 211 kg were then re-exported to Portugal. The average tusk weights were 5.3 kg in 1983 and 4.3 kg in 1984.

SOUTH AFRICA

Estimation of the precise amount of South African ivory in trade is complicated by the Customs Union which means that ivory from Botswana, SWA/Namibia and Zimbabwe passes through South Africa and its precise origin is not always correctly reported.

South Africa's CITES Management Authority reported exporting 688 tusks weighing 6402 kg in 1983 whose origin was stated to be South Africa, and another 392 tusks weighing 1933 kg of different origin. However, importing countries report rather more than this. Japanese Customs data show imports of 12 050 kg during 1983. A large proportion of this was re-exports from Hong Kong and has been discounted from the calculation of total export; however data provided by MITI indicate that 1938 kg were imported via Belgium and this quantity has been included although it may have left South Africa before 1983. Hong Kong reported importing 2195 tusks weighing 12 385 kg directly from South Africa, the USA reported importing 1800 kg and information from the trade suggests that at least 55 tusks weighing 1039 kg were imported by the UK. This information from importing countries suggests that South Africa's true exports in 1983 were at least 17 t with an average tusk weight of 6 kg. In addition it appears that at least another 20 t of ivory from neighbouring countries in the Customs Union were re-exported by South Africa.

South Africa reports exporting 948 tusks weighing 12 481 kg in 1984 of which 8051 kg was reported as going to Japan. This quantity plus Hong Kong's re-exports of 7519 kg of South African ivory to Japan closely match the 15 541 kg reported by Japanese Customs statistics. Hong Kong reported importing 1858 tusks weighing 13 099 kg in 1984 directly from South Africa, one UK trader imported 38 tusks weighing 1016 kg and US Customs statistics record 1413 kg imported from South Africa in the year up to November.

This suggests a total of at least 23.5 t coming from South Africa during 1984, with an average tusk weight estimated to be 7.4 kg. At least 5 t of this total was exported from South Africa in 1983 but did not arrive in Hong Kong until January 1984. This quantity should therefore be added to the total for 1983. However, it is not known how many of the imports reported for 1983 were 1982 exports, but if it were assumed that this was at least 2 t (reported by Hong Kong as being imported in January 1983) then annual totals were 20 t in 1983 and 18 t in 1984.

Private trophy shipments

In 1983 63 tusks were exported as private trophies, mainly to Europe and North America. Tusk weights were recorded for 37 of these and indicate an average tusk weight of 11.2 kg per tusk. In 1984 114 trophy tusks were exported, again mainly to Europe and North America. Weights were reported for 68 tusks which had an average weight of 9.9 kg.

ZAMBIA

No data are available from Zambia concerning commercial exports of ivory during 1983. However, information received from one ivory trader indicates that he imported over 10 t of ivory into Europe from Zambia during 1983 and 1984 and re-exported it to Japan and Hong Kong. CITES data from Japan and Hong Kong record the same quantity being imported in 1983, the ivory going to Japan being reported as a re-export from Belgium and that to Hong Kong as a direct import from Zambia. If this were indeed the same ivory it is interesting to note that the trader imported 1925 tusks with an average weight of 5.3 kg and Hong Kong imported 1761 tusks averaging 4.2 kg. This suggests that the 2803 kg imported by Japan averaged 17.1 kg per tusk, and that shipments from Africa were being split up in Europe - the smaller tusks going to Hong Kong and the larger to Japan.

The UK draft annual report to CITES for 1983 records imports totalling 5499 kg from Zambia, and information from the trade suggests that another 723 kg may have been imported. Hong Kong also reported importing Zambian ivory from South Africa in 1983, but this almost certainly left South Africa in 1982. Total exports from Zambia during 1983 may therefore have been in the region of 16 t and the available data suggest an average tusk weight of about 6 kg.

In 1984 Zambia offered 1900 kg for sale, and Zambian export permit books showed exports of 577 tusks weighing 1816 kg (R. Martin, in litt.) which represents an average tusk weight of 3.2 kg. Hong Kong reported importing 47 tusks weighing 673 kg and Japanese Customs data record an import during September of 1729 kg from Zambia. However, in October 1984 a shipment of about 375 tusks weighing approximately 1500 kg was observed being imported into Burundi via Lake Tanganyika. The boat used for this action reputedly came from Zambia, so it is probable that the ivory did also. Total exports from Zambia during 1984 would appear to have been around 4 t but it is impossible to determine the true scale of illegal trade.

Information from Dr Martin indicates that approximately 12 t of ivory are held in store in Zambia.

ZIMBABWE

The Zimbabwe Department of National Parks and Wild Life Management reports that during 1983 a total of 2550 tusks weighing 8625 kg were sold for export. Of these 1871 tusks went to South Africa, 663 tusks went to F.R.Germany and 16 tusks went to Hong Kong. The average tusk weight was 3.38 kg and approximately 1500 elephants were involved. Hong Kong reported importing a further 24 tusks weighing 475 kg from Zimbabwe during that year but these were originally exported in 1982.

In 1984 a total of 1786 tusks weighing 9250 kg were exported, 1081 tusks going to South Africa and 705 tusks to Japan. The average weight of the tusks was 5.2 kg and represents approximately 1051 elephants. It should be noted that the figure of 1.7 tusks per elephant has been used in these estimates of elephant numbers as culling operations in Zimbabwe include infant elephants.

Private trophy shipments

In 1983 Zimbabwe exported 453 tusks weighing 4946 kg as private hunting trophies, mainly to South Africa, Europe and North America. This suggests that about 241 elephants with an average tusk weight of 10.9 kg were involved. In 1984 the number of trophies exported increased to 578 tusks weighing 5990 kg, thus involving about 307 elephants with an average tusk weight of 10.4 kg.

Zimbabwe exported about 9 t of raw ivory in both 1983 and 1984 for the ivory trade. These commercial exports had a very low average tusk weight and reflect the effect of culling operations. Data for both commercial shipments and hunting trophies suggest that about 1741 elephants were involved in 1983 and approximately 1358 in 1984. However in addition to the ivory exported, Zimbabwe has a flourishing ivory carving industry which uses an estimated 14 to 15 t of ivory annually (Martin, 1984).

Section 2

IMPORTING COUNTRIES

From the 1983 CITES statistics, it appears that there are only twelve countries that have imported more than 1 t of tusks in 1983: Hong Kong, Japan, Belgium, Federal Republic of Germany, People's Republic of China, India, United Kingdom, United States of America, France, Taiwan, Italy and Thailand. We have therefore selected these for further consideration. It should be pointed out that these statistics indicate that the volume of world trade in tusks in 1983 amounted to at least 761 t plus a possible maximum of 8440 tusks (if none of them were included in the amount reported by weight), or (assuming a low 6 kg a tusk on average) 812 t of ivory tusks.

This does not necessarily represent the quantity that left Africa during the year, because large quantities have been held in store, in some cases for more than a year, and because some 1982 exports from Africa may not appear in trade statistics until 1983 when reported by an importing country. However, this does mean that an import of 1 t represents only about 0.1% of the recorded world trade volume. Therefore the listing of the above countries does not imply any significance in the world trade.

In consideration of the CITES statistics, except where otherwise specified, trade in scraps and pieces has been ignored; where recorded by number these data are useless for monitoring purposes. Where there is a likelihood of overlap between shipments recorded by number of tusks and those recorded by weight, the record by number has been ignored to avoid double counting. It should therefore be appreciated that the resulting estimates may be too low.

As the largest market for raw ivory, Hong Kong and Japan are considered first, the other main importers being treated in alphabetical order.

JAPAN & HONG KONG

The ivory carving industries of Hong Kong and Japan are the destination of most of Africa's ivory production. Trading between the two countries is heavy, and in general larger tusks go from Hong Kong to Japan and smaller ones from Japan to Kong Kong. The ivory trade of these countries during 1983 was the subject of a study carried out by WTMU on behalf of the CITES Technical Committee in 1984, and this section of the present report supplements the information in the earlier report. The data available to WTMU were:- Hong Kong 1984 statistics provided by the Hong Kong CITES Management Authority, Japanese statistics for January to June 1984 provided by the Japanese CITES Management Authority and Japanese Customs statistics of Elephant's tusks, including waste and powder, for January to December 1984.

Table 1 shows the origins of Hong Kong's gross imports of raw ivory from 1981 to 1984. Trade data for 1981 to 1983 are taken from Caldwell (1984).

Table 1

Reported origin of gross imports of whole tusks (kg) by Hong Kong 1981-84

COUNTRY	1981	1982	1983	1984
Botswana	-	1185	342	4257
CAR	75982	63096	186494	65956
Congo	117882	61009	814	39291
Cameroon	464	-	-	-
Kenya	824	5864	-	-
Malawi	-	-	430	-
Sudan	214187	219619	268677	25451
Somalia	14000	7468	-	-
Chad	8232	29411	30976	6260
Tanzania	2240	5073	545	4871
Uganda	26740	1957	403	22389
South Africa	6578	9801	15468	21596
Zambia	8195	7628	9659	3686
Zaire	8560	8921	40263	48038
Zimbabwe	-	72	1465	4421
Africa (unspecified)	3340	25194	2318	2694
Total	487224	446298	557854	248910

It is clear from Table 1 that Hong Kong's ivory trade underwent a dramatic change in 1984. Gross imports fell by 55% of their 1983 level and the total was the lowest recorded since Hong Kong began reporting to CITES in 1978. The greatest difference between 1983 and 1984 is the quantity reported to have been imported from Sudan. This fell from 269 t to 25 t and clearly reflects Sudan's ban on exports. Imports from CAR also fell by 120 t and those from Chad from 31 t to 6 t which may reflect the reduced quantities leaving those countries in 1984. The decline is also partly due to Belgium implementing stricter control measures after ratifying CITES.

Japan's gross imports do not show a similar decline. Customs statistics for 1984 record the import of 473 782 kg, only 2 t less than the record import of 475 t imported in 1983. Large amounts of CAR and 'Sudanese' ivory that left Belgium in late 1983 were imported during January and February and then imports fell to a low of 11.6 t in April. However by June the trade appears to have recovered from the combined effects of the export ban in Sudan and the stricter control measures in Belgium, and the second half of the year shows large quantities of ivory reported to be coming from Burundi, Tanzania and Uganda. Japan's gross imports are shown in Table 2.

Table 2

Japanese imports of elephant tusks, including waste and powder 1984

Taiwan	1740 kg
Burma	407 kg
Sudan	60282 kg
Chad	3156 kg
CAR	100744 kg
Congo	75799 kg
Zaire	49827 kg
Burundi	33118 kg
Somalia	7247 kg
Uganda	99320 kg
Tanzania	19932 kg
Zimbabwe	4217 kg
Namibia	723 kg
South Africa	15541 kg
Zambia	1729 kg
Total	473782 kg

Total imports by Japan and Hong Kong combined (excluding those from each other) were about 755 t in 1983 and fell to 501 t in 1984. Analysis of the data by the method used previously (Caldwell, 1984) suggests that about 71 619 tusks were involved during 1984 and that the average tusk weight was 7 kg. The results of this analysis are shown in Table 3.

Table 3

Import of raw tusks by Hong Kong and Japan corrected to eliminate double-counting

	1981		1982		1983		1984	
	HK	JP	HK	JP	HK	JP	HK	JP
Weight (t)	371.3	300.6	344.6	256.2	413.7	341.2	193.7	307.1
Total	671.9		600.7		754.8		500.8	
No. of tusks	76865	21345*	77392	26411*	91978	35067*	42455	29164*
Total	98210		103803		127045		71619	
Mean tusk weight (kg)	4.83	14.08	4.45	9.70	4.51	9.73	4.56	10.53
HK+JP combined	6.8		5.8		5.9		7.0	
No. of elephants	40886	11354	41165	14048	48829	18653	22582	15513
HK+JP Total	52240		55213		67482		38095	
Estimated world total on basis of HK + JP = 83%	62939		66524		81303		45896	

*Estimated on the basis of the average weight of tusks re-exported by Hong Kong to Japan.

For 1984 however it is possible to estimate the number of tusks involved in the trade using the average tusk weights derived from Japan's imports reported by MITI for the first six months of the year.

Japan's total import for 1984, less the tusks and scraps from Hong Kong and the ivory from Burma, amounts to 415 502 kg. If we assume that the average tusk weight for the year was the same as during the first six months (7.72 kg) the number of tusks imported by Japan would have been 53 822. Hong Kong only imported 85 326 kg (13 179 tusks) that did not pass through Japan. Thus the total import in 1984 of Japan and Hong Kong combined is estimated to have been 67 001 tusks weighing 500 828 kg. This produces an average tusk weight of 7.47 kg and suggests that 35 639 elephants were involved.

In addition to whole tusks, Hong Kong imports a considerable quantity of ivory scraps and cut pieces. This amounted to 100 t in 1983 and 125 t in 1984, however most of this was imported from Japan and does not increase the estimated amount of ivory reaching the Far East.

Hong Kong's re-exports in 1984 amounted to 99 t, the bulk being composed of whole tusks going to Japan and India with average weight of 10.5 kg and 4.5 kg respectively. The details are given in Table 4. Japan only reports re-exports to Hong Kong in both 1983 and the first six months of 1984.

Table 4

Hong Kong's reported re-exports of raw ivory in 1984

Destination	Weight of Tusks	Weight of Scraps	Total
China	2765	9279	12044
India	9543	-	9543
Japan	55180	2693	57873
Thailand	1645	1491	3136
Taiwan	3516	12640	16156
USA	147	70	217
F.R.Germany	-	7	7
Macau	-	20	20
Mexico	-	143	143
Singapore	-	115	115
Total	72796	26458	99254

BELGIUM

Because of its historical connections with Central Africa, Belgium has long played a leading role as a transit centre for ivory coming from Africa on its way to principal consumer countries. However, Belgium was not a Party to CITES until 1 January 1984; therefore, for all its importance, for 1983 we only know of its trade from reports of other countries.

Exports to Belgium in 1983 CITES annual reports totalled 80 550 kg of tusks plus 33 tusks, the bulk (80 245 kg = 99.6%) being from CAR. Imports of tusks from Belgium reported by other Parties that year amounted to 264 085 kg, 99.3% of this (262 376 kg) going to Japan. This supports the common knowledge that large quantities had been held

in store in Belgium in previous years, but it may also be a result of large amounts being exported to Belgium but not being reported by the exporting country.

The CITES Management Authority of Belgium has provided information on its raw ivory trade in 1984, to the CITES Secretariat. Imports in 1984 totalled 3776 tusks weighing 48 858 kg, plus 2123 kg of cut pieces, all directly from African countries. Most of the tusks were imported from CAR (43 147 kg = 88%) including several tons (6847 kg) reported as originating from Zaire. However, Belgium's reported re-exports in 1984 amounted to 6765 tusks, weighing 71 894 kg (all to Hong Kong and Japan) and 2425 kg of cut pieces. These records indicate that in 1984 Belgium was again a net re-exporter, of over 23 t of raw ivory. Japan's reported imports from Belgium in the first six months of 1984 amounted to 114 317 kg of tusks; Belgium only reports re-exporting 35 356 kg to Japan over the year but the discrepancy can to a large extent be accounted for by shipments which left Belgium in 1983 and arrived in Japan the following year. Belgium's reported re-exports to Hong Kong and the reported imports of the latter appear to match almost exactly except for two shipments from Belgium which in fact went to Japan.

From discussions with traders and government employees it seems that there are now unlikely to be large stocks of ivory remaining in Belgium.

CITES Records of Raw Ivory Destined for Belgium in 1983

Exporter	Origin	Imports reported	Exports reported
CF			30 tusks
CF			80245 kg tusks
DE	[ZA]		205 kg tusks
GB	[XX]		1 ivory piece
GB	[XX]		50 kg ivory scraps
TZ			100 kg tusks
ZM			3 tusks

PEOPLE'S REPUBLIC OF CHINA

In the annual reports of CITES Parties, only Hong Kong reports re-exporting raw ivory to the People's Republic of China in 1983, an amount totalling 26 912 kg of tusks and 6314 kg of ivory scraps and pieces. In addition, South Africa has notified WTMU of the export to China in 1983 of 149 kg of ivory tusks or cut pieces.

Information provided by the CITES Management Authority for Hong Kong indicates that in 1984 Hong Kong re-exported 124 tusks weighing 2765 kg to China and 9279 kg of cut pieces and scraps. These are the only data available on commercial exports to China in 1984.

CITES Records of Raw Ivory Destined for China in 1983

Exporter	Origin	Imports reported	Exports reported
HK	[BI]		20 kg ivory pieces
HK	[CF]		212 kg ivory pieces
HK	[CF]		22876 kg tusks
HK	[CG]		332 kg ivory pieces
HK	[CG]		39 kg tusks
HK	[SD]		1061 kg ivory pieces
HK	[SD]		2420 kg ivory scraps
HK	[SD]		2007 kg tusks
HK	[ZR]		2269 kg ivory pieces
HK	[ZR]		1990 kg tusks

Hong Kong Re-exports of Whole Tusks to China 1984

Origin	Number	Weight
CAR	73	1841.9
CAR	45	906.3
CAR	2	7.5
Congo	4	9
Total	124	2764.7

FRANCE

CITES annual report statistics indicate that France imported at least 9 tusks and 5774 kg of tusks in 1983, of which at least 5 tusks and 4440 kg came directly from African countries, and that only 27 tusks plus 40 kg were re-exported from France that year. There is no indication of the extent of France's trade in raw ivory in 1984.

It is noteworthy that there are two major ivory dealers based in France. However, much of the ivory in which they deal does not enter France but passes through in transit or goes via Belgium to Hong Kong and Japan.

CITES Records of Raw Ivory Destined for France in 1983

Exporter	Origin	Imports reported	Exports reported
AO		1 tusk	
AT		77 kg tusks	
BW		128 kg tusks	
CF		1705 kg tusks	446 kg tusks
CG			938 tusks
CG		225 kg tusks	
CI		254 kg tusks	
CM			2 tusks
CM		440 kg tusks	194 kg tusks
DE	[SD]		4 tusks
DE	[ZM]		36 kg tusks
GA		131 kg tusks	
GB	[BW]		8 kg ivory pieces
GB	[BW]		37 kg tusks
GB	[CF]		2 kg ivory pieces
GB	[CF]		967 kg tusks (probable error)
GB	[TZ]		4 kg ivory pieces
GB	[TZ]		5 kg tusks
GB	[XX]	1144 kg tusks	
GB	[ZM]		48 ivory pieces
GB	[ZM]		1 kg ivory piece
GB	[ZM]		976 kg tusks
IT	[XX]		27 kg tusks
NG		15 kg tusks	
SD		250 kg tusks	
TG		2 tusks	4 tusks
TN	[CM]		74 kg tusks
TZ		867 kg tusks	520 kg tusks
XX	[GB]	77 kg tusks	
ZW		351 kg tusks	

FEDERAL REPUBLIC OF GERMANY

CITES annual report statistics indicate that F.R.Germany was the destination of at least 33 059 kg of tusks plus 1002 tusks in 1983. All 1002 tusks plus 24 472 kg (74% of the quantity recorded by weight) came directly from African countries, including 7463 kg (23% of the total) from Sudan. A large quantity of ivory scraps and pieces is also imported by Germany, amounting to at least 1532 kg in 1983, nearly all from the UK.

There are few data available on the 1984 imports. The Government of Hong Kong reports an export to Germany of 7 kg of ivory scraps and pieces; South Africa exported 6 whole trophy tusks, and a UK trader has informed WTMU that he exported 1771 kg tusks and 2423 kg of offcuts to Germany.

CITES Records of Raw Ivory Destined for F.R. Germany in 1983

Exporter	Origin	Imports reported	Exports reported
CM		40 kg tusks	
FR	[SD]		2 tusks
FR	[SD]	40 kg tusks	
FR	[TG]		2 tusks
GB	[CF]		6 kg ivory pieces
GB	[CF]		95 kg tusks
GB	[CM]	176 kg tusks	301 kg tusks
GB	[NA]		288 ivory pieces
GB	[NA]		120 kg ivory pieces
GB	[NA]	490 kg ivory scraps	200 kg ivory scraps
GB	[NA]		290 kg tusks
GB	[TZ]		1488 ivory pieces
GB	[TZ]		199 kg ivory pieces
GB	[TZ]	415 kg ivory scraps	80 kg ivory scraps
GB	[TZ]	3199 kg tusks	1257 kg tusks
GB	[XX]		1 ivory piece
GB	[XX]		54 kg tusks
GB	[ZA]		9532 ivory pieces
GB	[ZA]		235 kg ivory pieces
GB	[ZA]	423 kg ivory scraps	
GB	[ZA]		623 kg tusks
GB	[ZM]		7132 ivory pieces
GB	[ZM]		155 kg ivory pieces
GB	[ZM]	200 kg ivory scraps	
GB	[ZM]		525 kg tusks
GB	[ZW]		1000 tusks
GB	[ZW]	3016 kg tusks	3015 kg tusks
HK	[CF]	2046 kg tusks	2046 kg tusks
HK	[SD]		4 kg ivory pieces
JP	[XX]	216 ivory pieces	
NL	[TD]	110 kg tusks	
SD		7463 kg tusks	
TG			2 tusks
TZ		216 ivory pieces	
TZ		529 kg tusks	892 kg tusks
ZA		13044 kg tusks	
ZW		3033 kg tusks	

INDIA

CITES annual report statistics for 1983 indicate that India was the destination of at least 14 332 kg of ivory tusks that year (see below). Only 82 kg of this (0.6%) came directly from African sources. India is an ivory carving centre and the world's second net exporter of ivory carvings. In 1983 it exported at least 12 582 kg of worked ivory, according to CITES annual report statistics, which is of the same order of magnitude as the previous two years and may suggest the level of future demand for the raw material.

India's sources of tusks in 1983 were Hong Kong and the UK. In 1984 Hong Kong exported 2108 tusks, weighing 9543 kg to India and a major UK trader re-exported 1555 kg, which is likely to form the bulk coming from this country. Thus the total known supply of raw ivory to India in 1984 was at least 11 098 kg of tusks.

CITES Records of Raw Ivory Destined for India in 1983

Exporter	Origin	Imports reported	Exports reported
DE	[TZ]	500 kg tusks	138 kg tusks
GB	[CM]		94 kg tusks
GB	[TZ]	591 kg tusks	1241 kg tusks
GB	[ZM]	682 kg tusks	1170 kg tusks
GB	[ZW]	228 kg tusks	734 kg tusks
HK	[CF]	2268 kg tusks	6517 kg tusks
HK	[CG]	1422 kg tusks	1217 kg tusks
HK	[SD]	1165 kg tusks	434 kg tusks
HK	[SO]	685 kg tusks	1232 kg tusks
HK	[TD]	404 kg tusks	1004 kg tusks
HK	[ZR]		107 kg tusks
TZ			82 kg tusks

ITALY

CITES annual report statistics indicate that Italy imported at least 11 tusks plus 4240 kg of tusks in 1983, of which the 11 tusks and 4086 kg were imported directly from African countries. A small amount of raw ivory (6 tusks plus 27 kg) was re-exported in 1983. The ivory is likely to be used internally for the most part, and Italy is one of the world's major importers of worked ivory.

We have no statistics relating to Italy's volume of raw ivory trade in 1984, and it does not figure as a country of consignment in the data provided by Hong Kong and Japan.

CITES Records of Raw Ivory Destined for Italy in 1983

Exporter	Origin	Imports reported	Exports reported
CF		77 kg tusks	1287 kg tusks
CG		67 kg tusks	
CI		3 kg tusks	
CM		4 tusks	
CM			157 kg tusks
EG	[XX]	2 kg tusks	
ET		11 kg tusks	
GB	[ZA]		96 ivory pieces
GB	[ZM]		384 ivory pieces
GH		15 kg tusks	
GQ		1 tusk	
HK	[MZ]	15 kg tusks	
HK	[ZA]		99 kg tusks
LR		2 kg tusks	
MW		1 kg tusk	
NG		4 tusks	
NG		14 kg tusks	
SA	[XX]	9 kg tusks	
SD		4 tusks	
SN		1 kg tusk	
TH	[XX]	1 kg tusk	
TZ		118 kg tusks	1347 kg tusks
ZA		1222 kg tusks	
ZM			4 tusks
ZM		2 kg tusks	
ZW		2 tusks	

TAIWAN

The published Customs statistics of Taiwan (below) indicate that in 1983 Taiwan imported 15 543 kg of raw ivory and 9678 kg from January to July 1984. The sources in 1984 are not recorded but in 1983 the main sources recorded were Congo, Central African Republic, Japan and South Africa, in that order. The import recorded from Japan compares well with Japan's CITES-reported re-export of 2955 kg of ivory scraps to Taiwan. However, the import reported from Hong Kong does not compare at all well with that country's data. Hong Kong's CITES statistics for 1983 record 4517 kg of tusks and 8581 kg of ivory pieces exported to Taiwan in 1983 and 3516 kg of whole tusks plus 12 640 kg of cut pieces and scraps in 1984. For 1983 this leaves a discrepancy between the two countries reports of 12 516 kg. Some of this might be accounted for by shipments in transit in Taiwan. However it is likely that much of what Hong Kong reports appears in Taiwan's statistics by country of origin. Supporting this idea, the figures on ivory from Tanzania match exactly (cf. tables below). On the other hand, some origins reported by Hong Kong do not appear at all in Taiwan's import figures, which may thus be thought to underestimate the volume of its trade. Moreover, the CITES statistics for 1983 appear to underestimate Taiwan's imports by about 10 t.

If Taiwan has not reported imports from Hong Kong by country of origin, then Taiwan may have imported nearly 29 t of raw ivory in 1983. The data for 1984 are insufficient.

Taiwan's Imports of Raw Ivory

	1983		1984 (January to July)	
Source	Weight (kg)	Value (NT$1000)	Weight (kg)	Value (NT$1000)
CAR	4169	5859		
Congo	5352	7184		
Hong Kong	684	689		
Ivory Coast	104	139		
Japan	2492	2217		
South Africa	1662	2222		
Sudan	51	71		
Tanzania	500	695		
USA	29	50		
Uganda	500	683		
Total	15543	19809	9678	12339

Source: Statistical Department, Inspectorate General of Customs, Taipei.

Hong Kong Exports of Tusks to Taiwan

1983		1984	
Origin	Weight(kg)	Origin	Weight(kg)
CAR	963	CAR	2853
Congo	2490	Sudan	163
Kenya	58	Zaire	500
Tanzania	500		
South Africa	435		
Zaire	71		
Total	4517	Total	3516

CITES Records of Raw Ivory Destined for Taiwan in 1983

Exporter	Origin	Imports reported	Exports reported
HK	[CF]		2923 kg ivory pieces
HK	[CF]		1121 kg tusks
HK	[CG]		4922 kg ivory pieces
HK	[CG]		2490 kg tusks
HK	[KE]		58 kg tusks
HK	[TD]		36 kg ivory pieces
HK	[TZ]		500 kg tusks
HK	[XF]		500 kg ivory pieces
HK	[ZA]		200 kg ivory pieces
HK	[ZA]		314 kg tusks
HK	[ZR]		71 kg tusks
JP	[KE]		1100 kg ivory scraps
JP	[XX]		1855 kg ivory scraps

THAILAND

The most recent Foreign Trade Statistics for Thailand (see below) record a total import of 5355 kg of unworked ivory from January to November 1983, 59% of this (3146 kg) coming from Sudan. The next most important sources recorded were Zaire and Hong Kong. Thailand's 1983 import represents an increase over the total for 1982, which was 3921 kg for the full year (69% coming from Sudan).

The only CITES statistics for 1983 relating to Thailand are 113 kg of ivory pieces reported as re-exports by F.R.Germany (which matches the Thailand data) and 2875 kg of tusks and 2276 kg of ivory pieces re-exported by Hong Kong. The latter is far greater than the Thailand data indicate. The discrepancy cannot be explained by assuming that Thailand was reporting the countries of origin of the imports from Hong Kong, although the quantity said to originate from Sudan (see below) could have been included in Thailand's record of Sudanese ivory.

In 1984 Hong Kong reported exporting 70 tusks weighing a total of 1645 kg and 1491 kg of cut pieces and scraps to Thailand.

On the basis of these data, if the records of Thailand and Hong Kong do not overlap, Thailand appears to have imported at least 9833 kg of raw ivory in 1983. The data for 1984 are insufficient.

Thailand's Imports of Unworked Ivory

	1982		1983 (January to November)	
Source	Weight (kg)	Value (Baht)	Weight (kg)	Value (Baht)
Burma	103	75700	44	40450
CAR			42	9098
F.R.Germany			112	4941
Hong Kong	112	145850	673	687497
Mexico	654	180686		
Namibia			112	147554
Burundi	128	175532		
Congo	203	264960		
South Africa			304	385174
Sudan	2721	1323029	3146	1252637
Sweden			115	25423
Zaire			807	871594
Total	3921	2165757	5355	3424368

Source: Foreign Trade Statistics of Thailand, Department of Customs, Bangkok

Hong Kong Exports of Tusks to Thailand

1983		1984	
Origin	Weight (kg)	Origin	Weight (kg)
CAR	990.84	CAR	914.42
Sudan	1395.3	Sudan	486.2
Chad	488.85	Zaire	244.22
Total	2874.99	Total	1644.84

CITES Records of Raw Ivory Destined for Thailand in 1983

Exporter	Origin	Imports reported	Exports reported
DE	[XX]		113 kg ivory pieces
HK	[CF]		152 kg ivory pieces
HK	[CF]		991 kg tusks
HK	[SD]		2124 kg ivory pieces
HK	[SD]		1395 kg tusks
HK	[TD]		489 kg tusks

UNITED KINGDOM

Information provided by the UK CITES Management Authority indicates that the commercial imports of raw ivory totalled 10 557 kg of tusks plus 1509 tusks in 1983 and 10 185 kg plus 600 tusks plus 7 pieces in 1984. (Records of 'pieces' were ignored in the 1983 data as being of uncertain status.) The CITES reports of exporting Parties underestimate the trade to the UK.

However a major UK trader has informed WTMU that his imports of tusks in 1983 totalled 13 388 kg (plus 203 kg of offcuts). 11 555 kg of this came directly from African countries. In 1984 the same trader imported 9924 kg of tusks (plus 440 kg of offcuts), of which 1321 kg came from F.R.Germany and 760 kg came from Belgium; the rest (7844 kg) came directly from African countries.

The UK also re-exports raw ivory and, according to CITES statistics, re-exported at least 13 124 kg of tusks plus 1006 tusks in 1983, making it a net exporter in that year. One UK trader re-exported 9343 kg (excluding offcuts) in 1984, and this is likely to form the bulk of UK re-exports in that year.

1983 Imports to UK of Raw Ivory for Trade Purposes

Origin	Consignment	Volume
Botswana	South Africa	15 kg
Botswana	South Africa	444 kg
CAR	Belgium	227 kg
CAR	Belgium	617 kg
CAR	Belgium	746 kg
Malawi	Malawi	2 tusks
Nigeria	Nigeria	1 tusk
South Africa	South Africa	388 kg
South Africa	South Africa	500 kg
Tanzania	Tanzania	260 kg
Tanzania	Tanzania	271 kg
Tanzania	Tanzania	390 kg
Tanzania	Tanzania	500 kg
Zaire	Zaire	5 tusks
Zambia	Zambia	2705 kg
Zambia	Zambia	2794 kg
Zimbabwe	South Africa	1500 tusks
Unknown	Sweden	1 tusk
Total		10557 kg
		1509 tusks

1984 Imports to UK of Tusks for Trade Purposes

Origin	Consignment	Volume
South Africa	South Africa	440 kg
South Africa	South Africa	2250 kg
Tanzania	Tanzania	5000 kg
Tanzania	Tanzania	600 tusks
Uganda	Uganda	7 pieces
Zambia	India	15 kg
Zimbabwe	South Africa	1000 kg
Zimbabwe	South Africa	1480 kg
Total		10185 kg
		600 tusks
		7 pieces

CITES Records of Raw Ivory Destined for United Kingdom in 1983

Exporter	Origin	Imports reported	Exports reported
AE	[XX]	1 tusk	
AO		5 ivory pieces	
AT	[XX]	8 ivory pieces	
BE	[CF]	1590 kg tusks	
BE	[XX]	1 ivory piece	
BW		8 ivory pieces	
BW		518 kg ivory pieces	
BW		700 kg tusks	
CA	[ZA]	43 ivory pieces	
CG		2 tusks	
CI		6 ivory pieces	
CM		6 ivory pieces	
CN	[XX]	95 ivory pieces	
DE	[XX]	44 ivory pieces	
ES	[XX]	4 ivory pieces	
FR	[SL]	1 tusk	
FR	[XX]	37 ivory pieces	
FR	[XX]	1 tusk	
GI	[XX]	1 ivory piece	
HK	[XX]	72786 ivory pieces	
HK	[XX]	3 kg ivory pieces	
HK	[ZA]	2622 ivory pieces	
IN	[XX]	925 ivory pieces	
IN	[XX]	20 kg ivory pieces	
IN	[XX]	2 tusks	
IT	[NG]	2 tusks	
JP	[XX]	7 ivory pieces	
KE		4 ivory pieces	
KE	[TZ]	2 ivory pieces	
KE	[UG]	20 ivory pieces	
MC	[XX]	4 ivory pieces	
MO	[XX]	2 ivory pieces	
MW		86 ivory pieces	
MW		2 tusks	
NG		20 ivory pieces	
NG		19 tusk	
NG	[XX]	3 tusks	
NZ	[XX]	2 ivory pieces	
SD		53 ivory pieces	
SE	[XX]	1 tusk	
SG	[XX]	34 ivory pieces	
TH	[SD]	6460 ivory pieces	
TH	[XX]	1975 ivory pieces	
TZ		152 ivory pieces	
TZ		1 kg ivory piece	
TZ		4 tusks	
TZ		1421 kg tusks	670 kg tusks
US	[XX]	8 ivory pieces	
US	[XX]	1 tusk	
US	[ZA]	1 tusk	
XX		8 kg ivory pieces	
XX		56 tusks	
ZA		30 ivory pieces	
ZA		812 kg ivory pieces	

CITES Records of Raw Ivory Destined for United Kingdom in 1983 (cont.)

Exporter	Origin	Imports reported	Exports reported
ZA		4 tusks	
ZA		888 kg tusks	
ZA	[BW]	459 kg tusks	
ZA	[NA]	150 kg ivory pieces	
ZA	[XX]	2 tusks	
ZA	[ZW]	570 kg ivory pieces	
ZA	[ZW]	1500 tusks	
ZA	[ZW]	1 tusk	
ZM		20 ivory pieces	
ZM		4 tusks	101 tusks
ZM		5499 kg tusks	
ZR		96 ivory pieces	
ZR		7 tusks	
ZW		60 ivory pieces	
ZW		7 tusks	
ZW	[XX]	1 tusk	

UNITED STATES OF AMERICA

CITES annual report statistics indicate that in 1983 the USA imported at least 5990 ivory tusks plus 7396 kg of tusks. Of this total, 653 tusks plus 6179 kg of tusks came directly from African countries, the bulk coming from South Africa, Zaire, Tanzania and CAR.

US Customs statistics for January to November 1984 record a total import of 7551 kg of raw ivory, including 7258 kg (96%) coming from African countries. By far the largest proportion of this is recorded as from Zaire (5560 kg = 74% of total), which still has a ban on commercial exports. Data on exports supplied by the Government of South Africa are roughly in accord with those recorded by US Customs.

CITES Records of Raw Ivory Destined for USA in 1983

Exporter	Origin	Imports reported	Exports reported
AO		8 tusks	
BE	[ZR]	263 lbs tusks	
BW		50 tusks	
BW		315 kg tusks	
BW	[ZA]	375 lbs tusks	
CA		2 tusks	3 tusks
CA	[KE]	5 tusk	
CF		1095 kg tusks	103 kg tusks
CG		1 tusk	
CH	[XX]	2 tusks	
CI	[XX]	8 tusks	
CM		4 tusks	
CM			10 kg tusks
DE	[ZM]		2 tusks
FR	[CF]	2 tusks	
FR	[SD]		4 tusks
FR	[XX]		9 tusks
GA		3 tusks	
GB	[BW]		139 kg tusks
GB	[BW]	306 lbs tusks	
GB	[CF]		67 kg tusks
GB	[CF]	149 lbs tusks	
GB	[MW]	2 tusks	
GB	[TZ]	28 lbs tusks	28 lbs tusks
GB	[XX]		139 kg ivory pieces
GB	[XX]		2 tusks
GB	[ZA]		48 ivory pieces
GB	[ZA]		175 lbs ivory pieces
GB	[ZA]	175 lbs tusks	
HK	[CF]	8 tusks	
HK	[CF]	26 kg tusks	
HK	[KE]		32 kg ivory pieces
HK	[KE]	1 tusk	
HK	[KE]	37 kg tusks	
HK	[KE]	30 lbs tusks	
HK	[MZ]		1 kg tusk
HK	[MZ]	2 lbs tusks	

CITES Records of Raw Ivory Destined for USA in 1983 (cont.)

Exporter	Origin	Imports reported	Exports reported
HK	[ZA]	5 tusks	
HK	[ZM]	2 tusks	
HK	[ZM]	9 kg tusks	
HK	[ZR]	4938 tusks	
HK	[ZR]	2 kg tusks	
HK	[ZR]	1445 lbs tusks	
LR		2 tusks	
MA	[XX]	2 tusks	
MW		2 tusks	
MX	[KE]	2 tusks	
NA		2 tusks	
NG		6 tusks	
NG	[XX]	2 tusks	
NO	[XX]		4 tusks
SA	[ZA]	6 kg tusks	
SA	[ZM]	4 tusks	
SD		22 tusks	
TH	[XX]	1 tusk	
TZ		14 tusks	
TZ		293 kg tusks	1239 kg tusks
TZ		298 lbs tusks	
US	[ZR]	340 tusks	
XX		10 tusks	
XX	[CF]	103 kg tusks	
XX	[NG]	2 tusks	
XX	[TZ]	2 tusks	
XX	[ZM]	1 tusk	
XX	[ZM]	26 kg tusks	
ZA		50 tusks	
ZA		11 kg tusks	
ZA		1789 kg tusks	
ZA	[ZW]	3 tusks	
ZA	[ZW]	1000 kg tusks	
ZA	[ZW]	31 lbs tusks	
ZM		81 lbs tusks	
ZR		314 tusks	
ZR		946 lbs tusks	
ZW		178 tusks	
ZW		70 kg tusks	

DISCUSSION

Recent changes in the trade

The complexities of the ivory trade make the estimation of total ivory production by Africa very difficult to determine. It has become apparent during the production of this report that any study based on data provided the importing countries will not necessarily reflect the current situation regarding exports from Africa. In addition it must be remembered that the amount of raw ivory exported is not in itself an absolute measure of the number of elephants killed. Several African countries have carving industries which utilize locally obtained ivory.

The current study was limited to trade in 1983 and 1984 so few data were available from African countries that related to earlier years. From the available evidence it appears that around 644 t of ivory left Africa in 1983 and about 357 t in 1984 (see Table 5). This latter figure is perhaps 50 t or more short of the true figure for 1984 as no account has been taken of ivory leaving Burundi towards the end of the year that has not yet appeared in importing country's trade statistics. Thus real exports from Africa in 1984 were more likely to have been between 410 t and 450 t. It is possible that in all the foregoing the figures for 1983 exports are overestimates as some ivory that left Africa in 1982 may not have been discounted.

Japan and Hong Kong between them imported 755 t in 1983 and 501 t in 1984 and other importing counties would have accounted for perhaps as much as another 100 t in each year. Thus during the two year period there appears to be a discrepancy of about 450 t between exports and imports. One possible explanation of this difference is that very large quantities of ivory left Africa in 1981 and 1982 and were held in store, probably in Belgium, before reaching their end markets. This appears to have been the case regarding exports from CAR - over 200 t was reported as being exported in 1982 but only about half this amount appeared in import figures - and it seems likely that a similar situation occurred for ivory leaving Sudan and Burundi. This does imply that well over 1000 t of raw ivory left Africa in 1982.

Table 5

Estimated weight (t) of raw ivory exported from Africa 1983 - 1984

Country	1983	1984
Chad	31	4.5
CAR	101	42
Congo	14	21
Zaire	270	195
Sudan	150	23
Somalia	7	-
Kenya	1	-
Tanzania	10	32
Zambia	16	4
Malawi	0.5	-
Zimbabwe	9	10
Botswana	2.5	4
Uganda	11	-
Namibia	1	3
South Africa	20	18
Total	644	356.5

Two events caused the ivory trade to undergo a change between 1983 and 1984. These were the ban on exports of raw ivory introduced by Sudan, and the introduction of stricter control measures by Belgium after that country ratified CITES. The export ban appears to have been effective and what little ivory left Sudan in 1984 was sold for export during 1983. The ban greatly affected Hong Kong's imports because Sudan had previously been that country's major supplier. One of the differences between the import policies of Japan and Hong Kong was that Japanese legislation allowed import of ivory solely on the basis of a country of origin certificate, whereas Hong Kong requires a CITES export or re-export certificate. Thus with Sudan closed down and CAR trying to reduce the level of exports the main outlet for illegally acquired ivory became Burundi once again. It was possible to ship ivory from Burundi into Japan but not directly to Hong Kong which explains why Japan's imports show no difference in quantity between 1983 and 1984 but Hong Kong's imports fell by 55%.

The effect of the altered situation in Belgium is less easy to, assess but it appears that the large stocks of ivory were run down during 1983 and 1984, Belgium appearing as a net re-exporter for 1984. As a result of these changes in Belgium the trade needed a new transit port outside Africa. Most of the ivory leaving Burundi appears to have gone firstly to Singapore and ivory from Tanzania appears to have been routed through Dubai.

Overall, therefore, the traders in Hong Kong have been affected more severely than those in Japan and imports from Japan formed almost 66% of Hong Kong's total imports of raw tusks in 1984.

Average tusk weight

Measurement of the average weight of tusks in trade provides a basis for computing the effect that trade is having on elephant populations and indicates which age and size classes of elephant are being killed. However estimation of average tusk weight from trade data is made difficult both by the paucity of data available and by the complicated nature of the trade itself.

Unfortunately average tusk weights cannot be reliably calculated using the data provided by the exporting countries in Africa because in the past these have been too few and because the falsification of permits has allowed exports far larger than may be recorded by the appropriate CITES Management Authorities (see Congo section).

Given the importance of Belgium as a transit port for trade between Africa and the Far East, and where sorting of shipments has taken place, the average weight of tusks imported and re-exported is obviously worth consideration. These are shown in Tables 6 and 7. However much of the illegal trade stopped being routed through Belgium in 1984 so that the import data will not be representative of the pattern in previous years. Belgium's re-exports for 1984 provide a larger sample than its imports but the average tusk weight is affected by imports in previous years.

Table 6

Average tusk weights based on imports by Belgium in 1984

Country of Origin	Number of Tusks	Tusk Weight (kg)	Mean weight per tusk (kg)
Botswana	6	71	11.83
CAR	2316	36660	15.82
Sudan	281	1872	6.66
Chad	579	2489	4.29
Tanzania	129	1279	9.91
Zaire	426	6487	15.22
Total	3737	48858	13.07

Table 7

Average tusk weights based on re-exports from Belgium in 1984

Country of Origin	Number of Tusks	Tusk Weight (kg)	Mean weight per tusk (kg)
Botswana	6	71	11.83
CAR	2416	38399	15.89
Sudan	3248	23028	7.08
Chad	579	2539	4.38
Tanzania	68	595	8.75
Zaire	426	6412	15.05
South Africa	22	850	38.63
Total	6765	71894	10.62

It is well known that the size of tusks that Hong Kong re-exports to Japan is larger than the average size of those they import and also that Japan re-exports its small tusks to Hong Kong. Furthermore, shipments of ivory may be sorted into larger and smaller tusks in Europe before re-export to the Far East. Thus analysis of average tusk weights imported by either of the major importers alone will greatly bias the result. In Japan's 1982 and 1983 annual reports to CITES only the weight of ivory imported was reported and not the numbers of tusks involved. So in previous studies of the trade, carried out by WTMU (WTMU, 1983; Caldwell, 1984), the average weight of tusks imported by Japan has been estimated on the assumption that it would be equivalent to the average weight of the tusks re-exported to Japan by Hong Kong. This has nonetheless tended to give a lower average weight than that suggested by Parker and Martin (1983) who based their estimate of Japan's imports on information supplied by Japanese traders. If we treat Hong Kong's 1984 data as outlined above, the average weight of Kong Kong's imports less the re-exports to Japan appears as 4.6 kg and the re-exports to Japan as 10.5 kg.

However MITI have, for the first time, provided tusk numbers as well as weight for Japan's imports during the first six months of 1984, and it is therefore possible to estimate the average weight of Japan's imports more precisely. In order to obtain average tusk weight therefore, the Japanese import data for the first six months of 1984 and the Hong Kong import data for the same period were used and any trade between the two countries was discounted. It is appreciated that there may still be biases caused by sorting at the point of export or re-export but, as the combined imports of Japan and Hong Kong span the full range of tusk weights and account for around ninety per cent of the ivory leaving Africa, any such bias should be negligible. As much of the ivory imported by Japan and Hong Kong comes via Belgium and includes tusks from elephants that died several years previously, the overall average tusk weight does not necessarily reflect the current status of wild populations.

Table 8

Average tusk weights based on imports by Japan and Hong Kong
January - June 1984

Country of Origin	Number of Tusks	Tusk Weight (kg)	Mean weight per tusk (kg)
Botswana	345	3208.30	9.29
CAR	9008	68824.30	7.64
Congo	4758	30519.20	6.41
Sudan	3882	26256.90	6.76
Chad	447	1533	3.42
Tanzania	30	167.5	5.58
Somalia	1170	7500	6.41
South Africa	2258	19724.20	8.73
Zaire	3618	32135.15	8.88
Zimbabwe	1831	6681.65	3.64
Total	27347	196550.20	7.18

Japanese imports in the first six months, other than from Hong Kong were 20 678 tusks weighing 159 833 kg which gives an average weight of 7.7 kg. This is much lower than has been estimated for Japan in the past. Hong Kong's imports over the same period, excluding those from Japan, were 6669 tusks weighing 36 717 kg, an average of 5.5 kg per tusk. The average tusk weights from Japan and Hong Kong combined are shown in Table 8.

Thus the average weight per tusk, estimated from information provided by Japan and Hong Kong, is about 7.2 kg. However due to the lack of information about tusks imported by Japan in the second half of 1984, particularly those reported to be from Uganda, there is no guarantee that this figure is correct for the whole year. It should be stressed that, as this figure was calculated by a different technique to that used in earlier reports (WTMU, 1983; Caldwell, 1984) it is not directly comparable to the estimations for previous years.

If the average tusk weight of Japan's first six months trade is applied to its imports (from Customs data) over the whole year, the overall average tusk weight for Japan and Hong Kong is increased to 7.47 kg. However, the production of this figure introduces added uncertainty by the assumption of constant average tusk weight, and we recommend the use of 7.2 kg.
(n.b. but see addendum below)

Permits

Falsification and forgery of documents is common practice in the ivory trade within some African countries and the CITES Secretariat's files contain many examples of permits that have been queried, particularly by the Hong Kong Management Authority. Such falsification often conceals the true origin of ivory in trade and, as mentioned previously, severely hampers estimation of realistic average tusk weights. In addition, it deprives African countries of the full revenue from ivory exports. During 1984 the authorities in both CAR and Congo took action against traders who were involved in such activities.

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ADDENDUM

Average tusk weights

After completion of this report, further information was received from the Management Authority of Japan which covered Japan's imports of raw ivory for the period July - December 1984. This has enabled us to recalculate the average weight of tusks imported by Hong Kong and Japan during 1984 using a much larger sample size. Table 8 has been updated and is presented below.

Table 8 (revised)

Average tusk weights based on imports by Japan and Hong Kong 1984

Country of Origin	Number of Tusks	Tusk Weight (kg)	Mean weight per tusk (kg)
Burundi	630	3790.00	6.01
Botswana	351	3279.30	9.34
CAR	10963	98276.50	8.96
Chad	1472	5305.10	3.60
Congo	11051	63367.00	5.73
Namibia	67	313.30	4.67
Somalia	1170	7500.00	6.41
South Africa	4299	29191.40	6.79
Sudan	5574	42139.34	7.55
Tanzania	2769	17420.10	6.29
Uganda	5347	14418.70	2.69
Zaire	4283	40536.91	9.46
Zambia	47	673.00	14.31
Zimbabwe	1541	7516.85	4.87
Africa (unspecified)	2884	17469.90	6.05
Total	52,448	351,197.40	6.69

Thus the average weight of tusks in 351 t of raw ivory imported by Japan and Hong Kong in 1984 was 6.69 kg, 0.5 kg less than was suggested by data for the first six months of the year. Although Japan reported importing at least another 68 t for which tusk weights were not available, it is unlikely that these would increase the average weight as the mean tusk weights of shipments from the same sources were generally below 6 kg.